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MISSILE WARNING AND SPACE SURVEILLANCE SENSOR REPAIR CAREER LAD--ETC(U)
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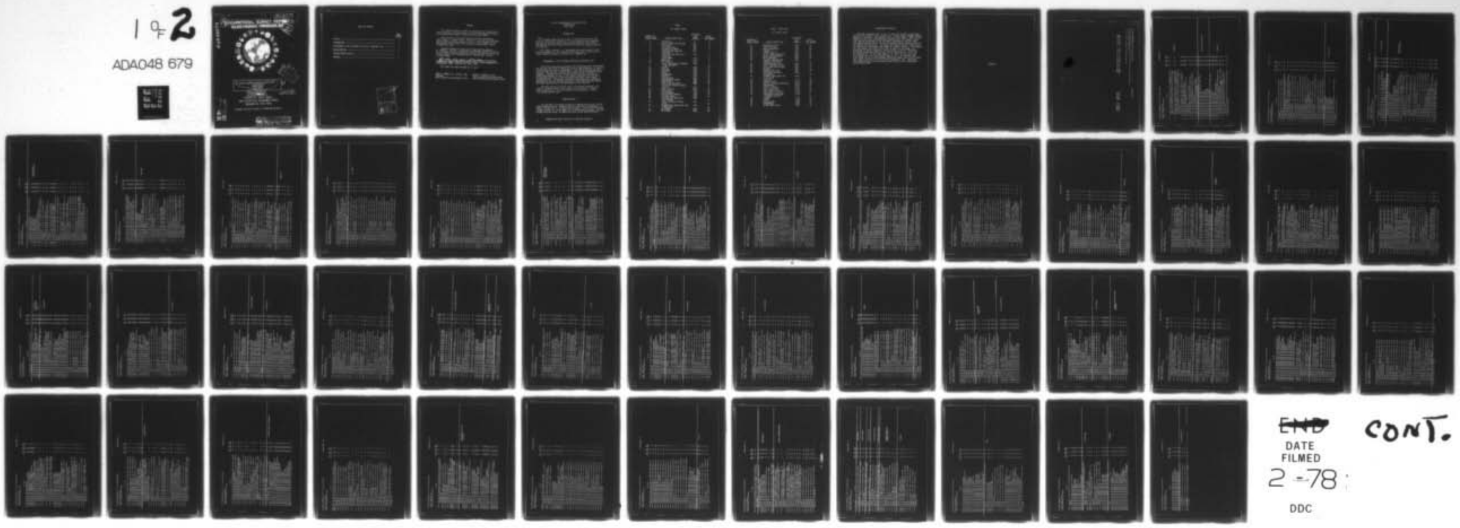

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~~ELECTRONIC PRINCIPLES~~

⑥ MISSILE WARNING AND SPACE SURVEILLANCE
SENSOR REPAIR
CAREER LADDER
AFSC 309X0,

⑭ AFPT-90-309-222

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OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
LACKLAND AFB TEXAS 78236

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PREFACE

This report presents a summary of the results of a detailed Air Force Electronic Principles Survey of the Missile Warning and Space Surveillance Sensor Repair Systems Specialty, AFSC 309X0.

The Electronic Principles Inventory (EPI) was developed by Major Thomas J. O'Connor and Mr. Hendrick W. Ruck and the survey data were analyzed by Captain Thomas E. Ulrich. All are members of the Occupational Survey Branch, USAF Occupational Measurement Center, Lackland AFB, Texas.

Computer programs for analyzing the data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Sciences Division, AFHRL.

~~Distribution of this report is made upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Lackland AFB, Texas 78236.~~

This report has been reviewed and is appr[illegible]

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MISSILE WARNING AND SPACE SURVEILLANCE
SENSOR REPAIR
AFSC 309X0

INTRODUCTION

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned to Missile Warning and Space Surveillance Sensor Repair Systems Specialty (AFSC 309X0). The data for this report were collected during the period April through July 1977.

This report describes: (1) development and administration of the survey instrument; and (2) electronic principles used by DAFSC 5-skill level personnel assigned to selected major commands.

DEVELOPMENT OF THE ELECTRONIC PRINCIPLES INVENTORY (EPI)

The EPI was developed by personnel from the Occupational Survey Branch who were well qualified in theoretical physics and electronics, as well as in task analysis and survey development. Over 300 maintenance personnel from SAC, TAC, ADC, MAC, and AFCS participated in the development of the inventory. Representing the five ATC training centers, electronics experts who averaged 12 years of maintenance experience and four years of electronic principles instruction experience spent several weeks refining the EPI. In addition, personnel at the Electrical Engineering Department of the USAF Academy and the Air Force Human Resources Laboratory were consulted during the development of the inventory.

The final version of the EPI used in this survey contained 1,257 items in 62 subject matter areas covering all electronic principles training given at the five ATC technical training centers. Table 1 lists the 62 subject areas.

ADMINISTRATION

The Electronic Principles Inventory was administered by mail to AFSC 30950 airmen worldwide. Responses from 60 individuals represented 63 percent of the total of all AFSC 30950 personnel. There are 96 AFSC 30950 airmen assigned, all in the CONUS, 95 of them assigned to ADCOM. They are divided into two shreds, 60 30950A personnel and 36 30950B personnel.

TABLE 1

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
1	MATHEMATICS	A1	2
2	DIRECT CURRENT AND VOLTAGE	A15	2
3	RESISTANCE	A24	2
4	MULTIMETER USES	B52	3
5	ALTERNATING CURRENT	B61	4
6	INDUCTORS AND INDUCTIVE REACTANCE	B67	4
7	CAPACITORS AND CAPACITIVE REACTANCE	C92	5
8	TRANSFORMERS	C128	6
9	MAGNETISM	C171	7
10	RCL CIRCUITS	D185	8
11	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)	D229	10
12	FILTERS	D239	10
13	COUPLING	E261	11
14	SOLDERING	E273	11
15	RELAYS	E294	12
16	MICROPHONES	F314	12
17	SPEAKERS	F327	13
18	OSCILLOSCOPES	F342	13
19	SEMICONDUCTOR DIODES	G354	13
20	TRANSISTORS	G404	15
21	TRANSISTOR AMPLIFIERS	G428	16
22	SOLID-STATE SPECIAL PURPOSE DEVICES	H477	19
23	POWER SUPPLIES	H483	19
24	OSCILLATORS	H512	19
25	MULTIVIBRATORS	I539	20
26	LIMITERS AND CLAMPERS	I555	21
27	ELECTRON TUBES	I565	21
28	ELECTRON TUBE AMPLIFIERS AND CIRCUITS	J609	22
29	SPECIAL PURPOSE ELECTRON TUBES	J616	23
30	HETERODYNING, MODULATION, AND DEMODULATION	J632	23
31	AM SYSTEMS	K638	23
32	FM SYSTEMS	K666	24

TABLE 1 (CONTINUED)

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER-	GPSUM PAGE NUMBER
33	NUMBERING SYSTEMS	K685	25
34	LOGIC FUNCTIONS	L695	25
35	BOOLEAN EQUATIONS	L708	26
36	COUNTERS	L733	27
37	TIMING CIRCUITS	M757	27
38	USE OF SIGNAL GENERATORS	M769	28
39	MOTORS AND GENERATORS	M779	28
40	METER MOVEMENTS	N808	29
41	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS	N818	29
42	WAVESHAPING CIRCUITS	N834	30
43	SINGLE SIDEBAND SYSTEMS	O845	30
44	PULSE MODULATION SYSTEMS	O875	31
45	ANTENNAS	O914	32
46	TRANSMISSION LINES	P953	34
47	WAVEGUIDES AND CAVITY RESONATORS	P984	35
48	MICROWAVE AMPLIFIERS AND OSCILLATORS	P1034	37
49	REGISTERS	Q1110	39
50	STORAGE DEVICES	Q1117	40
51	DIGITAL TO ANALOG CONVERTERS	Q1126	40
52	PHANTASTRONS	Q1140	41
53	SCHMITT TRIGGERS	R1141	41
54	CABLE FABRICATION	R1144	41
55	INPUT/OUTPUT DEVICES	S1146	41
56	PHOTO SENSITIVE DEVICES	S1149	41
57	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)	S1150	41
58	INFRARED	T1159	41
59	LASERS	T1186	42
60	DISPLAY TUBES	T1220	43
61	PROGRAMMING	U1234	43
62	DB AND POWER RATIOS	U1255	44

PRESENTATON OF RESULTS

Personnel responded "yes" or "no" to the 1,257 electronic principles questions as related to their present job. A Group Summary (GPSUM) computer printout is provided in the Appendix portion of this report. Page 1 of the GPSUM lists the three selected groups identified for this report. Pages 2-44 show the percentage of the incumbents responding to the EPI items. The computer program results display the percent members answering "yes" to the subject area questions. The reader can locate a specific subject area by referring to the Appendix page number as listed in Table 1. For example, the Transformers area results are given on page 6 of the GPSUM. The percentage of survey respondents indicating use of specific electronic principles ranged from high in areas such as Soldering (pp. 11-12) and Oscilloscopes (p. 13) and Power Supplies (p. 19) to low in areas such as Infrared (pp. 41-42) and Display Tubes (p. 43). In addition, some areas appear to discriminate between 30950A and 30950B, such as Oscillators (pp. 19-20), Counters (p. 27) and Single Sideband (p. 30). Additional AFSC 309X0 data can be obtained upon request to the Chief, Occupational Survey Branch (OMY).

APPENDIX

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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                                          GPSM15 PAGE   1

TABULATION OF ELECTRONIC PRINCIPLES UTILIZATION DATA FOR SELECTED GROUPS
IN THE 30950A/B CAREER FIELD.

REPORTS ON THE FOLLOWING GROUPS WERE REQUESTED


      GROUP IDENTITY =  SPC276  ALL AIRMEN DAFSC 30950A/B                          CONTAINING    60 MEMBERS.
      GROUP IDENTITY =  SPC279  ALL AIRMEN DAFSC 30950A                            CONTAINING    18 MEMBERS.
      GROUP IDENTITY =  SPC280  ALL AIRMEN DAFSC 30950B                            CONTAINING    42 MEMBERS.
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                               SPC  SPC  SPC
                    DY-TSK                                     276  279  280

A   1 A1-01 IN YOUR PRESENT JOB, DO YOU USE INSTRUMENTS, SUCH AS   85   89   83
        METERS OR OSCILLOSCOPES, IN WHICH IT IS NECESSARY TO
        AMPLIFY OR ATTENUATE VOLTAGE, RESISTANCE, ETC., BY POWERS
        OF 10.
A   2 A1-02 DO YOU USE PUBLICATIONS, SUCH AS A TECHNICAL ORDERS    67   67   67     MATHEMATICS
        OR MAINTENANCE MANUALS, IN WHICH IT IS NECESSARY FOR YOU
        TO MULTIPLY OR DIVIDE BY A POWER OF 10 BEFORE YOU CAN
        APPLY THE INFORMATION FROM THE PUBLICATION IN A USEFUL WAY
        ON THE JOB.
A   3 A1-03 DO YOU REARRANGE AND SOLVE FORMULAS OR EQUATIONS.      58   61   57
A   4 A1-04 DO YOU CALCULATE THE SQUARE ROOT OF A QUANTITY.        27   22   29
A   5 A1-05 DO YOU SOLVE FOR UNKNOWN QUANTITIES.                   38   33   40
A   6 A1-06 DO YOU CONVERT NUMBERS TO LOGARITHMS.                  25   28   24
A   7 A1-07 DO YOU USE LOGARITHM TABLES IN ANY TYPE OF             30   44   24
        CALCULATIONS.
A   8 A1-08 DO YOU SOLVE QUADRATIC EQUATIONS.                       7    0   10
A   9 A1-09 DO YOU USE THE NATURAL SYSTEM OF LOGARITHMS.           17   22   14
A  10 A1-10 DO YOU PERFORM CALCULATIONS ON VECTOR QUANTITIES.      13   11   14
A  11 A1-11 DO YOU WORK WITH TRIGONOMETRIC FUNCTIONS SUCH AS       32   33   31
        SINE, COSINE, OR TANGENT.
A  12 A1-12 DO YOU DETERMINE AREAS OF PLANE FIGURES.               10   11   10
A  13 A1-13 DO YOU SOLVE OR USE SIMULTANEOUS EQUATIONS.             7    0   10
A  14 A1-14 DO YOU SOLVE OR USE PROPORTIONS.                       33   33   33
A  15 A2-01 DO YOU USE THE TERM VOLTAGE OR VOLT (V).               95  100   97
A  16 A2-02 DO YOU USE THE TERM ELECTROMOTIVE FORCE (EMF).         43   33   48
A  17 A2-03 DO YOU USE THE TERM OHM.                               92   94   90
A  18 A2-04 DO YOU USE THE TERM ION.                               38   94   14     DIRECT CURRENT AND VOLTAGE
A  19 A2-05 DO YOU USE THE TERM DYNE.                               8   11    7
A  20 A2-06 DO YOU USE THE TERM AMPERE.                            92   94   90
A  21 A2-07 DO YOU USE THE TERM NEUTRON.                           13   17   12
A  22 A2-08 DO YOU USE THE TERM COULOMB.                           15   28   10
A  23 A2-09 DO YOU USE THE TERM PROTON.                            13   17   12
A  24 A3-01 DO YOU WORK WITH RESISTORS IN YOUR PRESENT JOB.        72   72   71
A  25 A3-02 DO YOU INSPECT RESISTORS.                              87   83   88
A  26 A3-03 DO YOU CLEAN RESISTORS.                                82   78   83
A  27 A3-04 DO YOU ADJUST RESISTORS.                               85   83   86
A  28 A3-05 DO YOU CHECK OHMIC VALUE OR RESISTORS.                 85   83   86
A  29 A3-06 DO YOU REMOVE OR REPLACE RESISTORS.                    85   83   86
A  30 A3-07 DO YOU USE OR REFER TO TEMPERATURE COEFFICIENTS FOR    38   44   36     RESISTANCE
        RESISTORS ON ANY TASKS YOU PERFORM.
A  31 A3-08 DO YOU USE OR REFER TO RESISTOR SYMBOLS SUCH AS FIXED  85   89   83
        RESISTOR SYMBOLS OR TAPPED RESISTOR SYMBOLS.
A  32 A3-09 DO YOU IDENTIFY OR CLASSIFY THE RESISTORS YOU WORK     80   89   76
        WITH AS CARBON, FIXED WIRE, SLIDE TAP, RHEOSTAT, OR
        POTENTIOMETER.
A  33 A3-10 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE OHMIC   85   83   86
        VALUE OF RESISTANCE.
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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                        GPSM15 PAGE   3

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                  SPC  SPC  SPC
                        DY-TSK                                    276  279  280

A  34 A3-11 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE         85   83   86
        TOLERANCE.
A  35 A3-12 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE         22   17   24
        FAILURE RATE.
A  36 A3-13 DO YOU MAKE DECISIONS IN WHICH YOU MUST DETERMINE HOW  20   11   24
        TWO OR MORE BATTERIES MUST BE CONNECTED TOGETHER TO
        ACHIEVE A SPECIFIC VOLTAGE.
A  37 A3-14 DO YOU USE OR REFER TO THE SCHEMATIC SYMBOLS WHICH     87   89   86
        REPRESENT BATTERIES, FUSES, CONDUCTORS, LAMPS, OR SWITCHES
A  38 A3-15 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES           60   72   55
        RESISTIVE CIRCUITS.
A  39 A3-16 DO YOU CALCULATE TOTAL CURRENT FOR SERIES RESISTIVE    50   61   45
        CIRCUITS.
A  40 A3-17 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES   60   67   57
        RESISTIVE CIRCUITS.
A  41 A3-18 DO YOU CALCULATE POWER DISSIPATION FOR SERIES          40   39   40
        RESISTIVE CIRCUITS.
A  42 A3-19 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES PARALLEL  58   72   52
        RESISTIVE CIRCUITS.
A  43 A3-20 DO YOU CALCULATE TOTAL CURRENT FOR SERIES PARALLEL     50   67   43
        RESISTIVE CIRCUITS.
A  44 A3-21 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES   57   67   52
        PARALLEL RESISTIVE CIRCUITS.
A  45 A3-22 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR        43   50   40
        SERIES PARALLEL RESISTIVE CIRCUITS.
A  46 A3-23 DO YOU CALCULATE POWER DISSIPATION FOR SERIES          28   28   29
        PARALLEL RESISTIVE CIRCUITS.
A  47 A3-24 DO YOU CALCULATE TOTAL RESISTANCE FOR PARALLEL         55   67   50
        RESISTIVE CIRCUITS.
A  48 A3-25 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RESISTIVE  47   61   40
        CIRCUITS.
A  49 A3-26 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR          55   61   52
        PARALLEL RESISTIVE CIRCUITS.
A  50 A3-27 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR        47   50   45
        PARALLEL RESISTIVE CIRCUITS.
A  51 A3-28 DO YOU CALCULATE POWER DISSIPATION FOR PARALLEL        33   28   36
        RESISTIVE CIRCUITS.
B  52 B1-01 DO YOU MEASURE RESISTANCE.                             83   83   83
B  53 B1-02 DO YOU REPAIR OHMMETERS.                               10    6   12
B  54 B1-03 DO YOU MEASURE VOLTAGE.                                87   89   86
B  55 B1-04 DO YOU REPAIR VOLTMETERS.                              10    0   14     MULTIMETER USES
B  56 B1-05 DO YOU REPAIR AMMETERS.                                 7    0   10
B  57 B1-06 DO YOU MEASURE CURRENT.                                65   83   86
B  58 B1-07 DO YOU USE MULTIMETERS.                                85   89   83
B  59 B1-08 DO YOU DIRECTLY USE A QUANTITY OF CHARGE CALLED A      13   11   14
        COULOMB.
B  60 B1-09 DO YOU READ SCHEMATICS.                                88  100   83
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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 276	SPC 279	SPC 260	
B	61	B2-01 DO YOU USE OR REFER TO THE TERM EFFECTIVE VOLTAGE (RMS).	75	83	71	
B	62	B2-02 DO YOU USE OR REFER TO THE TERM PEAK TO PEAK VOLTAGE.	87	83	88	ALTERNATING CURRENT
B	63	B2-03 DO YOU USE OR REFER TO THE TERM AVERAGE VOLTAGE (DC).	85	89	83	
B	64	B2-04 DO YOU USE OR REFER TO THE TERM WAVE LENGTH.	63	61	64	
B	65	B2-05 DO YOU USE OR REFER TO THE TERM FREQUENCY.	88	94	86	
B	66	B2-06 DO YOU USE OR REFER TO THE TERM INSTANTANEOUS VALUE.	40	39	40	
B	67	B3-01 DO YOU WORK WITH INDUCTORS OR CIRCUITS CONTAINING INDUCTORS, CHOKES, OR CHOKE COILS IN YOUR PRESENT JOB.	77	78	76	
B	68	B3-02 DO YOU INSPECT INDUCTORS.	78	83	76	
B	69	B3-03 DO YOU CLEAN INDUCTORS.	75	78	74	
B	70	B3-04 DO YOU ADJUST INDUCTORS.	75	72	76	
B	71	B3-05 DO YOU REMOVE OR REPLACE INDUCTORS.	82	83	81	
B	72	B3-06 DO YOU USE OR REFER TO INDUCTANCE.	62	72	57	
B	73	B3-07 DO YOU USE OR REFER TO HENRIES.	62	67	60	
B	74	B3-06 DO YOU USE OR REFER TO INDUCTIVE REACTANCE.	45	61	38	INDUCTORS AND INDUCTIVE REACTANCE
B	75	B3-09 DO YOU USE OR REFER TO COPPER LOSS IN INDUCTORS.	8	0	12	
B	76	B3-10 DO YOU USE OR REFER TO HYSTERESIS LOSS IN INDUCTORS.	6	6	10	
B	77	B3-11 DO YOU USE OR REFER TO EDDY CURRENT LOSS IN INDUCTORS	12	6	14	
B	78	B3-12 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTANCE IS PROPORTIONAL TO THE SQUARE OF THE NUMBER OF TURNS OF THE COIL.	17	11	19	
B	79	B2-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE CROSS SECTIONAL AREA OF THE CORE.	15	6	19	
B	80	B2-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS INVERSELY PROPORTIONAL TO ITS LENGTH.	13	6	17	
B	81	B2-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE PERMEABILITY OF THE CORE MATERIAL.	10	6	12	
B	82	B2-16 DO YOU CALCULATE INDUCTANCE FOR PARTICULAR INDUCTORS USING FORMULAS.	13	11	14	
B	83	B3-17 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTANCE IN SERIES.	18	17	19	
B	84	B3-18 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN PARALLEL.	17	11	19	
B	85	B3-19 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN SERIES-PARALLEL CIRCUITS.	15	6	19	
B	86	B3-20 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LAGS VOLTAGE IN AC INDUCTOR CIRCUITS.	37	39	36	
B	87	B3-21 DO YOU CALCULATE INDUCTIVE REACTANCE.	17	22	14	
B	88	B3-22 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTIVE REACTANCE IS DIRECTLY PROPORTIONAL TO FREQUENCY.	35	39	33	
B	89	B3-23 DO YOU WORK WITH POWER INDUCTORS.	48	72	38	
B	90	B3-24 DO YOU WORK WITH AUDIO FREQUENCY INDUCTORS.	30	22	33	
B	91	B3-25 DO YOU WORK WITH RADIO FREQUENCY INDUCTORS.	63	78	57	

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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                            GPSM15 PAGE  5

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                       SPC  SPC  SPC
                         DY-TSK                                        276  279  280

C  92 C1-01 DO YOU WORK WITH CAPACITOPS OR CIRCUITS CONTAINING           72   67   74
         CAPACITORS IN YOUR PRESENT JOB.
C  93 C1-02 DO YOU INSPECT CAPACITORS.                                  83   83   83      CAPACITORS AND
C  94 C1-03 DO YOU CLEAN CAPACITORS.                                    80   78   81      CAPACITIVE REACTANCE
C  95 C1-04 DO YOU ADJUST CAPACITORS.                                   77   78   76
C  96 C1-05 DO YOU TEST CAPACITORS.                                     73   78   71
C  97 C1-06 DO YOU DISCHARGE CAPACITORS.                                80   78   81
C  98 C1-07 DO YOU REMOVE OR REPLACE CAPACITORS.                        82   83   81
C  99 C1-08 DO YOU USE OR REFER TO DISTRIBUTED CAPACITANCE.             23   22   24
C 100 C1-09 DO YOU USE OR REFER TO ORBITAL STRESS OF ELECTRONS IN         8    6   10
         A DIELECTRIC.
C 101 C1-10 DO YOU USE OR REFER TO FARADS, MICROFARADS, OR               80   89   76
         PICOFARADS.
C 102 C1-11 DO YOU USE OR REFER TO CAPACITANCE.                         78   83   76
C 103 C1-12 DO YOU USE OR REFER TO DIELECTRIC CONSTANT                  20   17   21
C 104 C1-13 DO YOU USE OR REFER TO WORKING VOLTAGE RATING OF            73   78   71
         CAPACITORS
C 105 C1-14 DO YOU USE OR REFER TO CAPACITIVE REACTANCE                 40   50   36
C 106 C1-15 DO YOU USE OR REFER TO CAPACITOR COLOR CODES                57   72   50
C 107 C1-16 DO YOU WORK WITH CAPACITORS IN DC CIRCUITS                  83   89   81
C 108 C1-17 DO YOU WORK WITH CAPACITORS IN AC CIRCUITS                  82   83   81
C 109 C1-18 DO YOU WORK WITH CAPACITORS IN CIRCUITS WITH BOTH DC        82   78   83
         AND AC
C 110 C1-19 DO YOU WOPK WITH CAPACITORS IN DON'T REMEMBER WHICH          18   28   14
         CIRCUITS
C 111 C1-20 DO YOU CALCULATE CAPACITANCE FOP PARTICULAR                 12   11   12
         CAPACITORS USING FORMULAS
C 112 C1-21 DO YOU USE OR REFER TO THE GENERAL RULE THAT                15   11   17
         CAPACITANCE OF A CAPACITOR IS DIRECTLY PROPORTIONAL TO THE
         DIELECTRIC CONSTANT
C 113 C1-22 DO YOU USE OR REFER TO THE GENERAL RULE THAT                17   11   12
         CAPACITANCE OF A CAPACITOR IS INVERSELY PROPORTIONAL TO
         THE DIELECTRIC THICKNESS
C 114 C1-23 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS        25   39   19
         IN SERIES
C 115 C1-24 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS        28   39   24
         IN PARALLEL
C 116 C1-25 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS        28   39   24
         IN SERIES-PARALLEL CIRCUITS
C 117 C1-26 DO YOU USE OR REFER TO THE GENEPAL PULE THAT CURRENT        42   44   40
         DOES NOT FLOW THROUGH CAPACITORS, IT ONLY APPEARS TO DO SO
C 118 C1-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT        32   39   29
         LEADS VOLTAGE IN AC CAPACITOR CIRCUITS
C 119 C1-28 DO YOU USE OR REFER TO THE GENERAL PULE THAT                32   33   31
         CAPACITIVE REACTANCE IS INVERSELY PROPORTIONAL TO
         FREQUENCY
C 120 C1-29 DO YOU CALCULATE CAPACITIVE REACTANCE                       20   22   19
```

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280
C 121 C1-30 DO YOU WORK WITH ROTOR-STATOR (VARIABLE) CAPACITORS	72	72	71
C 122 C1-31 DO YOU WORK WITH COMPRESSION (TRIMMER) CAPACITORS	67	61	69
C 123 C1-32 DO YOU WORK WITH ELECTROLYTIC (FIXED) CAPACITORS	82	83	81
C 124 C1-33 DO YOU WORK WITH PAPER (FIXED) CAPACITORS	77	78	76
C 125 C1-34 DO YOU WORK WITH MICA (FIXED) CAPACITORS	77	83	74
C 126 C1-35 DO YOU WORK WITH CERAMIC (FIXED) CAPACITORS	77	83	74
C 127 C1-36 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF CAPACITORS	13	6	17
C 128 C2-01 DO YOU WORK WITH TRANSFORMERS IN YOUR PRESENT JOB	73	83	69
C 129 C2-02 DO YOU INSPECT TRANSFORMERS	83	83	83
C 130 C2-03 DO YOU CLEAN TRANSFORMERS	80	78	81
C 131 C2-04 DO YOU ADJUST TRANSFORMERS	60	61	60
C 132 C2-05 DO YOU TROUBLESHOOT TRANSFORMERS	78	83	76
C 133 C2-06 DO YOU REMOVE OR REPLACE COMPLETE TRANSFORMERS	82	83	81
C 134 C2-07 DO YOU REMOVE OR REPLACE TRANSFORMER PARTS, SUCH AS THE PRIMARY WINDING	12	6	14
C 135 C2-08 DO YOU MAKE A DISTINCTION BETWEEN MUTUAL INDUCTION AND MUTUAL INDUCTANCE (M)	7	6	7
C 136 C2-09 DO YOU USE THE SYMBOL FOR MUTUAL INDUCTANCE, M	3	0	5
C 137 C2-10 DO YOU REFER TO OR USE THE COEFFICIENT OF COUPLING WHEN WORKING WITH TRANSFORMERS	8	11	7
C 138 C2-11 DO YOU CALCULATE TURNS RATIOS FOR TRANSFORMERS USING CURRENT OR VOLTAGE RATIOS	12	11	12
C 139 C2-12 DO YOU REFER TO REFLECTED IMPEDANCE WHEN WORKING WITH TRANSFORMERS	18	22	17
C 140 C2-13 DO YOU CALCULATE IMPEDANCE INTERACTIONS FOR TRANSFORMERS	7	6	7
C 141 C2-14 DO YOU WORK WITH AUTOTRANSFORMERS	68	83	62
C 142 C2-15 DO YOU WORK WITH POWER TRANSFORMERS	80	89	76
C 143 C2-16 DO YOU WORK WITH AUDIO TRANSFORMERS	32	28	33
C 144 C2-17 DO YOU WORK WITH RADIO FREQUENCY TRANSFORMERS	70	78	67
C 145 C2-18 DO YOU WORK WITH DON'T REMEMBER WHAT TYPE OF TRANSFORMERS	12	11	12
C 146 C2-19 DO YOU CHECK TRANSFORMERS FOR OPEN WINDINGS BY MEASURING RESISTANCE	63	83	83
C 147 C2-20 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING RESISTANCE	80	83	79
C 148 C2-21 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING OUTPUT VOLTAGES	67	72	64
C 149 C2-22 DO YOU MEASURE RESISTANCE OF TRANSFORMER WINDINGS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	30	28	31
C 150 C2-23 DO YOU MEASURE OUTPUT VOLTAGE OF TRANSFORMERS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	43	44	43
C 151 C2-24 DO YOU REFER TO BASIC TRANSFORMER SCHEMATIC SYMBOLS FOR TRANSFORMERS	80	89	76

TRANSFORMERS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280
C 152	C2-25 DO YOU REFER TO MULTIPLE SECONDARY-WINDINGS SCHEMATIC SYMBOLS FOR TRANSFORMERS	79	89	74
C 153	C2-26 DO YOU REFER TO MULTIPLE TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	78	89	74
C 154	C2-27 DO YOU REFER TO CENTER TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	78	89	74
C 155	C2-28 DO YOU REFER TO AIR CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	52	56	50
C 156	C2-29 DO YOU REFER TO IRON CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	58	67	55
C 157	C2-30 DO YOU REFER TO COMBINATIONS OF THE ABOVE SCHEMATIC SYMBOLS FOR TRANSFORMERS	68	72	67
C 158	C2-31 DO YOU DETERMINE PHASE RELATIONSHIPS BETWEEN SECONDARY AND PRIMARY VOLTAGES OF TRANSFORMERS USING SCHEMATIC SYMBOLS	52	67	45
C 159	C2-32 DO YOU DETERMINE OR REFER TO THE TYPE OF CORE IN TRANSFORMERS YOU WORK WITH	27	72	29
C 160	C2-33 DO YOU REFER TO OR USE THE GENERAL RULE THAT THE TURNS RATIO OF A TRANSFORMER IS EQUAL TO THE VOLTAGE RATIO	32	22	36
C 161	C2-34 DO YOU USE OR REFER TO STEP-UP OR STEP-DOWN RATIOS FOR TRANSFORMERS	55	67	50
C 162	C2-35 DO YOU CALCULATE VOLTAGE RATIOS FOR TRANSFORMERS USING TURNS RATIOS	12	11	12
C 163	C2-36 DO YOU CALCULATE CURRENT RATIOS FOR TRANSFORMERS USING TURNS RATIOS	7	6	7
C 164	C2-37 DOES YOUR JOB INVOLVE ANY TASKS DEALING WITH THREE PHASE TRANSFORMERS	63	89	52
C 165	C2-38 DO YOU INSPECT THREE PHASE TRANSFORMERS	60	83	50
C 166	C2-39 DO YOU CLEAN OR LUBRICATE THREE PHASE TRANSFORMERS	55	72	48
C 167	C2-40 DO YOU ADJUST THREE PHASE TRANSFORMERS	45	56	40
C 168	C2-41 DO YOU TROUBLESHOOT THREE PHASE TRANSFORMERS	55	72	48
C 169	C2-42 DO YOU REMOVE OR REPLACE COMPLETE THREE PHASE TRANSFORMERS	48	72	38
C 170	C2-43 DO YOU REMOVE OR REPLACE THREE PHASE TRANSFORMER PARTS SUCH AS WINDINGS	12	11	12
C 171	C3-01 DO YOU USE OR REFER TO PERMANENT MAGNETS	50	78	38
C 172	C3-02 DO YOU USE OR REFER TO TEMPORARY MAGNETS	35	50	29
C 173	C3-03 DO YOU USE OR REFER TO RETENTIVITY OF MAGNETIC MATERIALS	7	0	10
C 174	C3-04 DO YOU USE OR REFER TO RELUCTANCE OF MAGNETIC MATERIALS	8	0	12
C 175	C3-05 DO YOU USE OR REFER TO PERMEABILITY OF MAGNETIC MATERIALS	10	6	12
C 176	C3-06 DO YOU USE OR REFER TO RESIDUAL MAGNETISM	13	6	17
C 177	C3-07 DO YOU USE OR REFER TO MAGNETIC LINES OF FORCE OR FLUX	20	28	17
C 178	C3-08 DO YOU USE OR REFER TO WEBER'S THEORY OF MAGNETISM	7	0	10

MAGNETISM

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  TASK  GROUP SUMMARY
  PERCENT MEMBERS PERFORMING

                                                                    SPC  SPC  SPC
                        DY-TSK                                      276  279  280

C 179 C3-09 DO YOU USE OR REFER TO DOMAIN THEORY OF MAGNETISM         7    0   10
C 180 C3-10 DO YOU USE OR REFER TO MAGNETIC INDUCTION                17   28   12
C 181 C3-11 DO YOU USE OR REFER TO FLUX DENSITY                      12   11   12
C 182 C3-12 DO YOU USE OR REFER TO THE GENERAL RULE THAT FOR         40   56   33
      MAGNETIC POLES, LIKE POLES REPEL AND UNLIKE POLES ATTRACT
C 183 C3-13 DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE          15   11   17
      DIRECTION OF MAGNETIC FIELDS ABOUT STRAIGHT WIRES
C 184 C3-14 DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE NORTH    13    6   17
      POLE OF A CURRENT CARRYING COIL
-------------------------------------------------------------------------------------------------------
D 185 D1-01 DO YOU WORK WITH RC, LR, RCL CIRCUITS IN YOUR            65   78   60
      PRESENT JOB
D 186 D1-02 DO YOU USE OR REFER TO VECTORS WHEN WORKING WITH RCL     25   28   24          RCL CIRCUITS
      CIRCUITS
D 187 D1-03 DO YOU USE OR REFER TO PYTHAGOREAN THEOREM WHEN          20   17   21
      WORKING WITH RCL CIRCUITS
D 188 D1-04 DO YOU USE OR REFER TO SINE WHEN WORKING WITH RCL        25   22   26
      CIRCUITS
D 189 D1-05 DO YOU USE OR REFER TO COSINE WHEN WORKING WITH RCL      27   22   29
      CIRCUITS
D 190 D1-06 DO YOU USE OR REFER TO TANGENT WHEN WORKING WITH RCL     17   17   17
      CIRCUITS
D 191 D1-07 DO YOU USE OR REFER TO WATTS WHEN WORKING WITH RCL       57   72   50
      CIRCUITS
D 192 D1-08 DO YOU USE OR REFER TO TRUE POWER (PT) WHEN WORKING      38   44   36
      WITH RCL CIRCUITS
D 193 D1-09 DO YOU USE OR REFER TO MAXIMUM POWER (PM) WHEN           47   61   40
      WORKING WITH RCL CIRCUITS
D 194 D1-10 DO YOU USE OR REFER TO AVERAGE POWER (PAVE) WHEN         50   72   40
      WORKING WITH RCL CIRCUITS
D 195 D1-11 DO YOU USE OR REFER TO APPARENT POWER (PA) WHEN          33   50   26
      WORKING WITH RCL CIRCUITS
D 196 D1-12 DO YOU USE OR REFER TO POWER FACTOR (PF) WHEN WORKING    32   44   26
      WITH RCL CIRCUITS
D 197 D1-13 DO YOU USE OR REFER TO RESONANT CIRCUITS WHEN            62   83   52
      WORKING WITH RCL CIRCUITS
D 198 D1-14 DO YOU USE OR REFER TO BANDWIDTH WHEN WORKING WITH       70   89   62
      RCL CIRCUITS
D 199 D1-15 DO YOU USE OR REFER TO SELECTIVITY WHEN WORKING WITH     55   83   43
      RCL CIRCUITS
D 200 D1-16 DO YOU USE OR REFER TO RESONANT FREQUENCY WHEN           67   83   60
      WORKING WITH RCL CIRCUITS
D 201 D1-17 DO YOU USE OR REFER TO HALF POWER POINTS WHEN            60   78   52
      WORKING WITH RCL CIRCUITS
D 202 D1-18 DO YOU USE OR REFER TO BANDPASS REGION WHEN WORKING      63   83   55
      WITH RCL CIRCUITS
D 203 D1-19 DO YOU USE OR REFER TO CIRCUIT Q WHEN WORKING WITH       30   50   21
      RCL CIRCUITS
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 TASK  GROUP SUMMARY
PERCENT MEMBERS PERFORMING

                                                            SPC  SPC  SPC
                  DY-TSK                                    276  279  280

D 204 D1-20 DO YOU USE OR REFER TO TANK CIRCUITS WHEN WORKING  57   78   48
      WITH RCL CIRCUITS
D 205 D1-21 DO YOU DETERMINE VALUES OF TRIGONOMETRIC FUNCTIONS  8   11    7
      USING FORMULAS
D 206 D1-22 DO YOU DRAW VOLTAGE, CURRENT, OR IMPEDANCE VECTOR   8   11    7
      DIAGRAMS FOR CIRCUITS
D 207 D1-23 DO YOU CALCULATE TOTAL IMPEDANCE FOR CAPACITIVE    17   22   14
      CIRCUITS
D 208 D1-24 DO YOU CALCULATE PHASE ANGLES BETWEEN IMPEDANCE AND  7    6    7
      RESISTANCE IN CAPACITIVE CIRCUITS
D 209 D1-25 DO YOU CALCULATE TOTAL IMPEDANCE FOR SERIES RCL    15   17   14
      CIRCUITS
D 210 D1-26 DO YOU CALCULATE IMPEDANCE ANGLES FOR SERIES RCL    7    6    7
      CIRCUITS
D 211 D1-27 DO YOU CALCULATE APPARENT POWER (PA) FOR SERIES RCL 10  17    7
      CIRCUITS
D 212 D1-28 DO YOU CALCULATE TRUE POWER (PT) FOR SERIES RCL    17   28   12
      CIRCUITS
D 213 D1-29 DO YOU CALCULATE POWER FACTORS (PF) FOR SERIES RCL  15  22   12
      CIRCUITS
D 214 D1-30 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RCL    15   17   14
      CIRCUITS
D 215 D1-31 DO YOU CALCULATE IMPEDANCE ANGLES FOR PARALLEL RCL  7    6    7
      CIRCUITS
D 216 D1-32 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL   5   11    2
      CIRCUITS USING THE ASSUMED VOLTAGE METHOD
D 217 D1-33 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL  22   28   19
      CIRCUITS USING OHM'S LAW
D 218 D1-34 DO YOU CHECK CAPACITORS USING OHMMETERS            63   83   55
D 219 D1-35 DO YOU CHECK CAPACITORS USING SUBSTITUTION         52   56   50
D 220 D1-36 DO YOU CHECK INDUCTORS USING OHMMETERS             60   78   52
D 221 D1-37 DO YOU CHECK INDUCTORS USING SUBSTITUTION          52   67   45
D 222 D1-38 DO YOU USE OR REFER TO THE GENERAL RULE THAT        8    6   10
      THETA= 0, PF = 1, AND PA = PT FOR RESONANT CIRCUITS
D 223 D1-39 DO YOU CALCULATE RESONANT FREQUENCIES FOR RCL      17   22   14
      CIRCUITS
D 224 D1-40 DO YOU USE OR REFER TO THE GENERAL RULE THAT       27   33   24
      IMPEDANCE IS MINIMUM AND CURRENT MAXIMUM AT THE RESONANT
      FREQUENCY FOR SERIES RCL CIRCUITS
D 225 D1-41 DO YOU USE OR REFER TO THE GENERAL RULE THAT LINE  22   28   19
      CURRENT IS MINIMUM AND IMPEDANCE MAXIMUM AT RESONANT
      FREQUENCY FOR PARALLEL RCL CIRCUITS
D 226 D1-42 DO YOU USE OR REFER TO THE GENERAL RULE THAT HALF  50   56   48
      POWER POINTS ARE AT 70.7 PERCENT OF THE PEAK CURRENT VALUE
D 227 D1-43 DO YOU USE OR REFER TO THE GENERAL RULE THAT       23   33   19
      BANDWIDTH IS INVERSELY PROPORTIONAL TO Q
D 228 D1-44 DO YOU DETERMINE HOW CHANGES IN FREQUENCY, RESISTANCE 13 11   14
      , CAPACITANCE, OR INDUCTANCE WILL AFFECT CURRENT OR PHASE
      ANGLES FOR RCL CIRCUITS
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280	
D 229 D2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH, USE, OR REFER TO SERIES OR PARALLEL RESONANT CIRCUITS OR TIME CONSTANTS	52	78	40	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)
D 230 D2-02 DO YOU WORK WITH, USE, OR REFER TO TIME CONSTANTS	53	83	40	
D 231 D2-03 DO YOU WORK WITH, USE, OR REFER TO AVAILABLE VOLTAGE	30	44	24	
D 232 D3-04 DO YOU WORK WITH, USE, OR REFER TO TRANSIENT INTERVALS	27	33	24	
D 233 D2-05 DO YOU USE OR REFER TO THE GENERAL RULE THAT A CAPACITOR IS FULLY CHARGED (OR DISCHARGED) AFTER FIVE (5) TIME CONSTANTS (TC)	32	61	19	
D 234 D2-06 DO YOU USE OR REFER TO UNIVERSAL TIME CONSTANT CHARTS	5	6	5	
D 235 D2-07 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CIRCUIT CURRENT OR COMPONENT VOLTAGES AFTER A SPECIFIC TIME FOR RC OR LR CIRCUITS	8	0	12	
D 236 D2-08 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE THE TIME REQUIRED FOR CIRCUIT CURRENT OR COMPONENT VOLTAGES TO REACH SPECIFIC VALUES FOR RC OR LR CIRCUITS	17	17	17	
D 237 D2-09 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE COMPONENT VALUES REQUIRED FOR CIRCUIT CURRENT AND COMPONENT VOLTAGES TO REACH SPECIFIC VALUES IN SPECIFIC TIMES	15	22	12	
D 238 D2-10 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT IN LR CIRCUITS REACHES ITS MINIMUM VALUE (OR ZERO) AFTER FIVE (5) TIME CONSTANTS	15	22	12	
D 239 D3-01 DO YOU WORK WITH CIRCUITS USED AS FILTERS IN YOUR PRESENT JOB	68	83	62	
D 240 D3-02 DO YOU INSPECT FILTER CIRCUITS	70	83	64	
D 241 D3-03 DO YOU CLEAN FILTER CIRCUITS	63	83	55	
D 242 D3-04 DO YOU ALIGN OR ADJUST FILTER CIRCUITS	63	83	55	
D 243 D3-05 DO YOU TROUBLESHOOT TO THE FILTER CIRCUIT LEVEL	70	83	64	FILTERS
D 244 D3-06 DO YOU TROUBLESHOOT TO COMPONENT PARTS	68	78	64	
D 245 D3-07 DO YOU REMOVE OR REPLACE THE COMPLETE FILTER CIRCUIT	68	83	62	
D 246 D3-08 DO YOU REMOVE OR REPLACE FILTER CIRCUIT COMPONENT PARTS	65	78	60	
D 247 D3-09 DO YOU WORK WITH LOW PASS FILTERS	70	89	62	
D 248 D3-10 DO YOU WORK WITH HIGH PASS FILTERS	68	89	60	
D 249 D3-11 DO YOU WORK WITH BANDPASS FILTERS	72	89	64	
D 250 D3-12 DO YOU WORK WITH BAND-REJECT FILTERS	52	56	50	
D 251 D3-13 DON'T REMEMBER WHICH TYPE OF FILTER YOU WORK WITH	12	17	10	
D 252 D3-14 DO YOU WORK WITH L-SECTION FILTER CONFIGURATION	48	56	45	
D 253 D3-15 DO YOU WORK WITH T-SECTION FILTER CONFIGURATION	48	56	45	
D 254 D3-16 DO YOU WORK WITH PI-SECTION FILTER CONFIGURATION	40	39	40	
D 255 D3-17 DON'T REMEMBER WHICH TYPE FILTER CONFIGURATION	28	44	21	
D 256 D3-18 DO THE FILTERS YOU WORK WITH USE PARALLEL RESONANT CIRCUITS	45	50	43	
D 257 D3-19 DO THE FILTERS YOU WORK WITH USE SERIES-PARALLEL CIRCUITS	47	50	45	
D 258 D3-20 DO THE FILTERS YOU WORK WITH USE SERIES RESONANT CIRCUITS	47	50	45	

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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                          GPSM15 PAGE  11

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                    SPC  SPC  SPC
                        QY-TSK                                      276  279  280

D 259 D3-21 DON'T REMEMBER WHICH TYPE OF BASIC CIRCUIT               30   50   21
D 260 D3-22 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE            10   11   10
        CAPACITANCE OR INDUCTANCE VALUES REQUIRED FOR SPECIFIC
        FILTERS
E 261 E1-01 DO YOU WORK WITH COUPLING DEVICES IN YOUR PRESENT JOB    72   78   69
E 262 E1-02 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO      67   72   64
        THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH RC                          COUPLING
        COUPLING
E 263 E1-03 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO      62   61   62
        THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH
        IMPEDANCE COUPLING
E 264 E1-04 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO      70   78   67
        THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH
        TRANSFORMER COUPLING
E 265 E1-05 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS       67   67   67
        WHICH PERFORM RC COUPLING
E 266 E1-06 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS       60   56   62
        WHICH PERFORM IMPEDANCE COUPLING
E 267 E1-07 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS       70   72   69
        WHICH PERFORM TRANSFORMER COUPLING
E 268 E1-08 DO YOU WORK WITH DIRECTLY COUPLED CIRCUITS               68   72   67
E 269 E1-09 DO YOU WORK WITH CAPACITIVE-RESISTIVE COUPLED            65   67   64
        CIRCUITS
E 270 E1-10 DO YOU WORK WITH CAPACITIVE-INDUCTIVE COUPLED            67   67   67
        CIRCUITS
E 271 E1-11 DO YOU WORK WITH TRANSFORMER COUPLED CIRCUITS            70   78   67
E 272 E1-12 DON'T REMEMBER WHICH TYPE OF COUPLING CIRCUITS           10   11   10
E 273 E2-01 IN YOUR PRESENT JOB, DO YOU PERFORM SOLDERING            80   83   79
        TECHNIQUES OR INSPECT OR EVALUATE SOLDERED CONNECTIONS
E 274 E2-02 DO YOU SELECT TYPE OF SOLDER TO USE                      72   61   76
E 275 E2-03 DO YOU ADD FLUX TO CONNECTIONS                           75   78   74       SOLDERING
E 276 E2-04 DO YOU CLEAN CONNECTIONS USING SOLVENTS                  80   72   83
E 277 E2-05 DO YOU STRIP INSULATION FROM WIRES                       85   83   86
E 278 E2-06 DO YOU CONNECT OR DISCONNECT HEAT SINKS                  85   83   86
E 279 E2-07 DO YOU BEND OR SHAPE WIRES OR LEADS                      83   83   83
E 280 E2-08 DO YOU CUT WIRES                                         85   83   86
E 281 E2-09 DO YOU FILE OR SHAPE SOLDERING IRON TIPS                 82   78   83
E 282 E2-10 DO YOU TIN SOLDERING IRON TIPS                           83   83   83
E 283 E2-11 DO YOU CLEAN SOLDERING IRON TIPS                         85   83   86
E 284 E2-12 DO YOU CLEAN ELECTRICAL SURFACES USING ERASERS           82   83   81
E 285 E2-13 DO YOU TIN OR PRE-TIN CONDUCTORS                         82   83   81
E 286 E2-14 DO YOU INSPECT SOLDERED CONNECTIONS                      85   83   86
E 287 E2-15 DO YOU DESOLDER CONNECTIONS BY WICKING                   75   83   71
E 288 E2-16 DO YOU DESOLDER CONNECTIONS USING VACUUM DESOLDERING     82   83   81
        TOOLS
E 289 E2-17 DO YOU CUT COMPONENT LEADS TO REMOVE COMPONENTS          72   67   74
E 290 E2-18 DO YOU CRUSH COMPONENTS FOR REMOVAL                      32   22   36
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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                                    GPSM15 PAGE  12

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                       SPC  SPC  SPC
                    DY-TSK                                             276  279  280

E 291 E2-19 DO YOU MAKE HARDWIRE CONNECTIONS                            82   78   83
E 292 E2-20 DO YOU MAKE PRINTED CIRCUIT BOARD CONNECTIONS               82   78   83
E 293 E2-21 DO YOU SOLDER PASSIVE COMPONENTS SUCH AS RESISTORS OR       82   78   83
        CAPACITORS ON PRINTED CIRCUIT BOARDS
E 294 E2-22 DO YOU SOLDER ACTIVE COMPONENTS SUCH AS SOLID-STATE         82   78   83
        DIODES OR TRANSISTORS ON PRINTED CIRCUIT BOARDS
E 295 E3-01 DO YOU WORK WITH RELAYS ON YOUR PRESENT JOB                 82   89   79
E 296 E3-02 DO YOU ADJUST RELAYS                                        70   78   67
E 297 E3-03 DO YOU CLEAN RELAYS                                         78   83   76      RELAYS
E 298 E3-04 DO YOU INSPECT RELAYS                                       78   83   76
E 299 E3-05 DO YOU REMOVE OR REPLACE COMPLETE RELAYS                    80   83   79
E 300 E3-06 DO YOU REMOVE OR REPLACE PARTS OR RELAYS                    53   56   52
E 301 E3-07 DO YOU TROUBLESHOOT RELAYS                                  75   83   71
E 302 E3-08 DO YOU STRAIGHTEN RELAY CONTACTS                            70   78   67
E 303 E3-09 DO YOU PERFORM TASKS ON RELAY CONTACTS                      75   78   74
E 304 E3-10 DO YOU PERFORM TASKS ON RELAY CORES                         33   39   31
E 305 E3-11 DO YOU PERFORM TASKS ON RELAY COILS                         29   44   36
E 306 E3-12 DO YOU PERFORM TASKS ON RELAY ARMATURES                     45   50   43
E 307 E3-13 DO YOU PERFORM TASKS ON RELAY SPRINGS                       57   67   52
E 308 E3-14 DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW            70   78   67
        (SPST), NORMALLY OPEN (NO) SCHEMATIC SYMBOLS FOR RELAYS
E 309 E3-15 DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW            70   78   67
        (SPST), NORMALLY CLOSED (NC) SCHEMATIC SYMBOLS FOR RELAYS
E 310 E3-16 DO YOU USE OR REFER TO SINGLE POLE, DOUBLE THROW            67   78   62
        (SPDT) SCHEMATIC SYMBOLS FOR RELAYS
E 311 E3-17 DO YOU USE OR REFER TO DOUBLE POLE, DOUBLE THROW            67   78   62
        (DPDT) SCHEMATIC SYMBOLS FOR RELAYS
E 312 E3-18 DO YOU USE OR REFER TO OTHER RELAY SYMBOLS SCHEMATIC        78   89   74
        SYMBOLS FOR RELAYS
E 313 E3-19 DO YOU CHECK ELECTRICAL CONTINUITY OF COILS BY              75   83   71
        MEASURING RESISTANCE
F 314 F1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING       17   39    7
        WITH MICROPHONES
F 315 F1-02 DO YOU INSPECT MICROPHONES                                  10   28    2      MICROPHONES
F 316 F1-03 DO YOU CLEAN MICROPHONES                                    10   22    5
F 317 F1-04 DO YOU OPERATE MICROPHONES                                  17   33   10
F 318 F1-05 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE                 12   39    0
        CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT
        PARTS OR MICROPHONES
F 319 F1-06 DO YOU TROUBLESHOOT DOWN TO MICROPHONE PARTS                 7   11    5
F 320 F1-07 DO YOU REMOVE OR REPLACE COMPLETE MICROPHONES               13   33    5
F 321 F1-08 DO YOU REMOVE OR REPLACE MICROPHONE PARTS                    8   22    2
F 322 F1-09 DO YOU PERFORM TASKS ON CARBON MICROPHONES                  10   28    2
F 323 F1-10 DO YOU PERFORM TASKS ON CAPACITOR MICROPHONES                0    0    0
F 324 F1-11 DO YOU PERFORM TASKS ON CRYSTAL MICROPHONES                  2    0    2
F 325 F1-12 DO YOU PERFORM TASKS ON DYNAMIC MICROPHONES                  2    0    2
F 326 F1-13 DO YOU PERFORM TASKS ON VELOCITY RIBBON MICROPHONES          0    0    0
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280	
F 327	F2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH SPEAKERS	25	22	26	
F 328	F2-02 DO YOU INSPECT SPEAKERS	18	17	19	
F 329	F2-03 DO YOU CLEAN SPEAKERS	17	17	17	SPEAKERS
F 330	F2-04 DO YOU OPERATE SPEAKERS	23	22	24	
F 331	F2-05 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OF SPEAKERS	22	22	21	
F 332	F2-06 DO YOU TROUBLESHOOT DOWN TO SPEAKER PARTS	8	6	10	
F 333	F2-07 DO YOU REMOVE OR REPLACE COMPLETE SPEAKERS	23	22	24	
F 334	F2-08 DO YOU REMOVE OR REPLACE SPEAKER PARTS	3	6	2	
F 335	F2-09 DO YOU PERFORM ANY TASKS ON SPEAKER CONES	2	0	2	
F 336	F2-10 DO YOU PERFORM ANY TASKS ON SPEAKER SPIDERS	2	0	2	
F 337	F2-11 DO YOU PERFORM ANY TASKS ON SPEAKER FIELD COILS	2	0	2	
F 338	F2-12 DO YOU PERFORM ANY TASKS ON SPEAKER VOICE COILS	2	0	2	
F 339	F2-13 DO YOU PERFORM ANY TASKS ON SPEAKER PERMANENT MAGNETS	5	11	2	
F 340	F2-14 DO YOU PERFORM ANY TASKS ON SPEAKER ELECTROMAGNETS	2	0	2	
F 341	F2-15 DO YOU PERFORM ANY TASKS ON SPEAKER SOFT IRON CORES	2	0	2	
F 342	F3-01 DO YOU USE OSCILLOSCOPES IN YOUR PRESENT JOB	90	89	90	
F 343	F3-02 DO YOU USE OSCILLOSCOPES TO PERFORM OPERATIONAL CHECKS	87	89	86	
F 344	F3-03 DO YOU USE OSCILLOSCOPES TO PERFORM ALIGNMENTS OR ADJUSTMENTS	82	83	81	OSCILLOSCOPES
F 345	F3-04 DO YOU USE OSCILLOSCOPES TO TROUBLESHOOT ELECTRONIC CIRCUITS	60	78	81	
F 346	F3-05 DO YOU USE OSCILLOSCOPES TO MEASURE FREQUENCY	68	83	90	
F 347	F3-06 DO YOU USE OSCILLOSCOPES TO MEASURE TIME	87	89	86	
F 348	F3-07 DO YOU USE OSCILLOSCOPES TO OBSERVE LISAJOUS PATTERNS	32	17	38	
F 349	F3-08 DO YOU USE OSCILLOSCOPES TO OBSERVE SIGNALS WHILE UTILIZING ATTENUATOR PROBES	85	83	86	
F 350	F3-09 DO YOU USE OSCILLOSCOPES TO MAKE FREQUENCY OR TIME MEASUREMENTS USING DELAY TIME MULTIPLIERS	80	89	76	
F 351	F3-10 DO YOU USE OSCILLOSCOPES TO MEASURE AC VOLTAGE	65	89	83	
F 352	F3-11 DO YOU USE OSCILLOSCOPES TO MEASURE OR OBSERVE SIGNALS AFTER FIRST ADJUSTING THE GAIN AND DC BAL CONTROLS	85	83	86	
F 353	F3-12 DO YOU USE OSCILLOSCOPES TO MEASURE DC VOLTAGE	83	83	83	
G 354	G1-01 DO YOU WORK WITH SEMICONDUCTOR DIODES IN YOUR PRESENT JOB	83	89	81	
G 355	G1-02 DO YOU INSPECT DIODES	82	83	81	SEMICONDUCTOR DIODES
G 356	G1-03 DO YOU REMOVE OR REPLACE DIODES	82	83	81	
G 357	G1-04 DO YOU CHECK DIODES USING AN INSTRUMENT	82	83	81	
G 358	G1-05 DO YOU USE ENERGY LEVEL DIAGRAMS IN YOUR WORK WITH DIODES	7	6	7	
G 359	G1-06 DO YOU USE PN JUNCTION DIODE CHARACTERISTIC CURVES, TOGETHER WITH VALUES OF FORWARD AND REVERSE BIAS VOLTAGE, TO COMPUTE FORWARD OR REVERSE LIAS RESISTANCE	12	17	10	
G 360	G1-07 DO YOU COMPUTE FORWARD OR REVERSE BIAS RESISTANCE FOR DIODES	22	33	17	

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 TASK  GROUP SUMMARY
PERCENT MEMBERS PERFORMING
                                                                      SPC  SPC  SPC
                    DY-TSK                                            276  279  280
G 361 GI-08 DO YOU USE OR REFER TO THE GENERAL RULE THAT               65   72   62
            TEMPERATURE CAN AFFECT THE OPERATION OF DIODES
G 362 GI-09 DO YOU IDENTIFY SEMICONDUCTOR DIODES AS OPPOSED TO          75   83   71
            OTHER ELECTRONIC COMPONENTS, SUCH AS RESISTORS, BASED ON
            THEIR PHYSICAL APPEARANCE
G 363 GI-10 DO YOU REFER TO OR DO YOU DETERMINE THE GENERAL             8   17    5
            EFFECTS OF DOPING ON CURRENT FLOW
G 364 GI-11 DO YOU USE OR REFER TO MEASUREMENTS OF FORWARD BIAS        65   67   64
            RESISTANCE
G 365 GI-12 DO YOU USE OR REFER TO DIODE COLOR CODING                  47   56   43
G 366 GI-13 DO YOU USE OR REFER TO CENTRIFUGAL FORCE OF AN              7    0   10
            ELECTRON IN ORBIT AROUND A NUCLEUS
G 367 GI-14 DO YOU USE OR REFER TO CENTRIPETAL FORCE OF AN              7    0   10
            ELECTRON IN ORBIT AROUND A NUCLEUS
G 368 GI-15 DO YOU USE OR REFER TO DIODE NUMBERING SYSTEM, SUCH        70   83   64
            AS IN 538
G 369 GI-16 DO YOU USE OR REFER TO KINETIC ENERGY OF AN ELECTRON        7    0   10
            MOVING IN ORBIT
G 370 GI-17 DO YOU USE OR REFER TO POTENTIAL ENERGY OF AN               7    0   10
            ELECTRON MOVING IN ORBIT
G 371 GI-18 DO YOU USE OR REFER TO MEASUREMENTS OF REVERSE BIAS        62   67   60
            RESISTANCE
G 372 GI-19 DO YOU USE OR REFER TO NUMBER OF ELECTRONS IN A             5    0    7
            PARTICULAR SHELL OR ORBIT
G 373 GI-20 DO YOU USE OR REFER TO PERMISSIBLE ENERGY LEVELS OF         5    0    7
            AN ORBITING ELECTRON
G 374 GI-21 DO YOU USE OR REFER TO FORBIDDEN ENERGY LEVELS OF AN        7    0   10
            ORBITING ELECTRON
G 375 GI-22 DO YOU USE OR REFER TO VALENCE ELECTRONS (THOSE IN          7    0   10
            THE OUTERMOST SHELL)
G 376 GI-23 DO YOU USE OR REFER TO ATOMIC NUMBER (TOTAL NUMBER OF       5    0    7
            ELECTRONS IN ATOM)
G 377 GI-24 DO YOU USE OR REFER TO SYMBOLS ON THE DIODE WHICH          75   83   71
            INDICATE THE CATHODE END
G 378 GI-25 DO YOU NEED TO KNOW WHICH MATERIALS ARE USED IN THE        28   33   26
            CONSTRUCTION OF DIODES SUCH AS GERMANIUM OR SILICON
G 379 GI-26 DO YOU NEED TO KNOW THAT SEMICONDUCTORS HAVE NEGATIVE      33   39   31
            TEMPERATURE COEFFICIENTS OF RESISTANCE (AS TEMPERATURE
            INCREASES RESISTANCE DECREASES)
G 380 GI-27 DO YOU USE OR REFER TO PN JUNCTION DIODE                   17   17   17
            CHARACTERISTIC CURVES, SUCH AS VOLTAGE - CURRENT
            CHARACTERISTIC CURVES (PERHAPS YOU DO THIS TO IDENTIFY
            POINTS OF STRUCTURAL BREAKDOWN OR OPERATING REGIONS)
G 381 GI-28 DO YOU DETERMINE WHETHER PN JUNCTION DIODES ARE            67   78   62
            FORWARD BIASED OR REVERSE BIASED WHEN YOU READ OR
            INTERPRET CIRCUIT DIAGRAMS
G 382 GI-29 DO YOU USE OR REFER TO VALENCE BAND IN SEMICONDUCTOR        3    0    5
            MATERIALS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                SPC  SPC  SPC
                     DY-TSK                                     276  279  280

G 383 G1-30 DO YOU USE OR REFER TO FORBIDDEN BAND IN              3    0    5
           SEMICONDUCTOR MATERIALS
G 384 G1-31 DO YOU USE OR REFER TO CONDUCTION BAND IN             2    0    2
           SEMICONDUCTOR MATERIALS
G 385 G1-32 DO YOU USE OR REFER TO COVALENT BONDING IN            2    0    2
           SEMICONDUCTOR MATERIALS
G 386 G1-33 DO YOU USE OR REFER TO ELECTRON-HOLE PAIR CREATED IN  7    6    7
           SEMICONDUCTORS
G 387 G1-34 DO YOU USE OR REFER TO ELECTRON FLOW OR HOLE FLOW IN 17   11   19
           SEMICONDUCTORS
G 388 G1-35 DO YOU USE OR REFER TO DONOR IMPURITY IN              8    6   10
           SEMICONDUCTORS
G 389 G1-36 DO YOU USE OR REFER TO ACCEPTOR IMPURITY IN           7    6    7
           SEMICONDUCTORS
G 390 G1-37 DO YOU USE OR REFER TO P-TYPE SEMICONDUCTOR MATERIAL 47   50   45
G 391 G1-38 DO YOU USE OR REFER TO N-TYPE SEMICONDUCTOR MATERIAL 47   50   45
G 392 G1-39 DO YOU USE OR REFER TO MAJORITY CARRIERS IN          12   11   12
           SEMICONDUCTORS
G 393 G1-40 DO YOU USE OR REFER TO MINORITY CARRIERS IN          12   11   12
           SEMICONDUCTORS
G 394 G1-41 DO YOU USE OR REFER TO JUNCTION RECOMBINATION IN      8    6   10
           SEMICONDUCTORS
G 395 G1-42 DO YOU USE OR REFER TO DEPLETION REGION IN           12   11   12
           SEMICONDUCTORS
G 396 G1-43 DO YOU USE OR REFER TO RELATIONSHIP BETWEEN BARRIER   8    0   12
           WIDTH AND DIFFERENCE OF POTENTIAL
G 397 G1-44 DO YOU USE OR REFER TO THE 10:1 BACK TO FRONT        60   67   57
           RESISTANCE RATIO FOR DIODES
G 398 G1-45 DO YOU USE OR REFER TO BARRIER HEIGHT IN              3    0    5
           SEMICONDUCTORS
G 399 G1-46 DO YOU USE OR REFER TO DIODE SUBSTITUTION            60   61   60
           INFORMATION
G 400 G1-47 DO YOU USE OR REFER TO MAXIMUM AVERAGE FORWARD       32   39   29
           CURRENT DIODE RATINGS
G 401 G1-48 DO YOU USE OR REFER TO PEAK RECURRENT FORWARD CURRENT 27  22   29
           DIODE RATINGS
G 402 G1-49 DO YOU USE OR REFER TO MAXIMUM SURGE CURRENT DIODE   30   39   26
           RATINGS
G 403 G1-50 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE 33  39   31
           DIODE RATINGS
G 404 G2-01 DO YOU WORK WITH TRANSISTORS IN YOUR PRESENT JOB.    83   89   81
G 405 G2-02 DO YOU INSPECT TRANSISTORS                           82   83   81
G 406 G2-03 DO YOU REMOVE OR REPLACE TRANSISTORS                 82   83   81       TRANSISTORS
G 407 G2-04 DO YOU CHECK TRANSISTORS USING AN INSTRUMENT         77   78   76
G 408 G2-05 DO YOU USE OR REFER TO EMITTER - BASE (EB) FORWARD   78   83   76
           AND REVERSE RESISTANCE MEASUREMENTS
G 409 G2-06 DO YOU USE OR REFER TO COLLECTOR - BASE (CB) FORWARD 78   83   76
           AND REVERSE RESISTANCE MEASUREMENTS
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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                              GPSM15 PAGE  16

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                      SPC  SPC  SPC
                   DY-TSK                                             276  279  280

G 410 G2-07 DO YOU USE OR REFER TO EMITTER - COLLECTOR (EC)            78   83   76
      RESISTANCE MEASUREMENTS
G 411 G2-08 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE             27   28   26
      PHYSICAL BARRIER WIDTH OF THE EMITTER - BASE JUNCTION
G 412 G2-09 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE             23   28   21
      PHYSICAL BARRIER WIDTH OF THE COLLECTOR - BASE JUNCTION
G 413 G2-10 DO YOU USE OR REFER TO THE PHYSICAL SIZE OF THE            42   44   40
      TRANSISTOR STRUCTURE (COLLECTOR, BASE AND EMITTER)
G 414 G2-11 DO YOU USE OR REFER TO LEAKAGE CURRENT (ICBO) IN A         20   22   19
      TRANSISTOR
G 415 G2-12 DO YOU USE OR REFER TO TRANSISTOR SCHEMATIC SYMBOLS        82   89   79
G 416 G2-13 DO YOU USE OR REFER TO TRANSISTOR NOTATION SUCH AS         83   89   81
      Q1, Q2, Q3, ETC
G 417 G2-14 DO YOU USE OR REFER TO TRANSISTOR SUBSTITUTION             68   61   71
      INFORMATION
G 418 G2-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE           35   33   36
      TRANSISTOR BASE CURRENT IB IS NORMALLY SIGNIFICANTLY
      SMALLER THAN THE EMITTER CURRENT IE (USUALLY IB BEING 2 TO
      8 PERCENT OF IE)
G 419 G2-16 DO YOU USE THE INFORMATION THAT THE EFFECT OF EMITTER      58   67   55
      BASE VOLTAGE ON BASE CURRENT IS THE CONTROLLING FACTOR FOR
      TRANSISTORS
G 420 G2-17 DO YOU USE THE GENERAL RULE THAT LEAKAGE CURRENT           27   28   26
      (ICBO) IN A TRANSISTOR INCREASES AS TEMPERATURE INCREASES
G 421 G2-18 DO YOU USE OR REFER TO TRANSISTOR CHARACTERISTIC           13   11   14
      CURVES
G 422 G2-19 DO YOU USE OR REFER TO BETA TRANSISTOR GAINS               12    6   14
G 423 G2-20 DO YOU USE OR REFER TO ALPHA TRANSISTOR GAINS               8    6   10
G 424 G2-21 DO YOU USE OR REFER TO GAMMA TRANSISTOR GAINS               5    6    5
G 425 G2-22 DO YOU CALCULATE BETA TRANSISTOR GAINS                      5    0    7
G 426 G2-23 DO YOU CALCULATE ALPHA TRANSISTOR GAINS                     5    0    7
G 427 G2-24 DO YOU CALCULATE GAMMA TRANSISTOR GAINS                     5    0    7
G 428 G3-01 DO YOU WORK WITH TRANSISTOR AMPLIFIERS IN YOUR             80   89   76
      PRESENT JOB
G 429 G3-02 DO YOU INSPECT TRANSISTOR AMPLIFIERS                       80   83   79
G 430 G3-03 DO YOU ALIGN OR ADJUST TRANSISTOR AMPLIFIERS               77   83   74
G 431 G3-04 DO YOU TROUBLESHOOT TO THE AMPLIFIER CIRCUIT LEVEL         78   83   76
G 432 G3-05 DO YOU TROUBLESHOOT TO AMPLIFIER COMPONENTS                77   83   74
G 433 G3-06 DO YOU REMOVE OR REPLACE THE COMPLETE AMPLIFIER            75   83   71
G 434 G3-07 DO YOU REMOVE OR REPLACE AMPLIFIER COMPONENTS              75   83   71
G 435 G3-08 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN      33   33   33
      COLLECTOR CURRENT WHICH RESULTS FROM A CHANGE IN BASE
      CURRENT
G 436 G3-09 DO YOU USE OR REFER TO (COMMON EMITTER) THE                12    6   14
      CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN
      COLLECTOR CURRENT WHICH RESULTS FROM A SPECIFIC CHANGE IN
      BASE CURRENT
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TRANSISTOR
AMPLIFIERS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280
G 437	G3-10 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A CHANGE IN BASE CURRENT	37	33	38
G 438	G3-11 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	8	6	10
G 439	G3-12 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN BASE CURRENT WHICH RESULTS FROM AN INPUT SIGNAL	32	50	24
G 440	G3-13 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN BASE CURRENT WHICH RESULTS FROM A SPECIFIC INPUT SIGNAL	10	6	12
G 441	G3-14 DO YOU USE THE LOAD-LINE METHOD OF ANALYSIS IN YOUR CIRCUIT ANALYSIS (THIS METHOD REQUIRES YOU TO PLOT A LOAD-LINE ON A TRANSISTOR CHARACTERISTIC CURVE)	5	6	5
G 442	G3-15 DO YOU USE OR REFER TO THE OPERATING POINT Q (QUIESCENT POINT) FOR A TRANSISTOR	17	22	14
G 443	G3-16 DO YOU CALCULATE THE SPECIFIC QUIESCENT POINT FOR A PARTICULAR TRANSISTOR	3	0	5
G 444	G3-17 DO YOU MEASURE VOLTAGE GAIN USED IN THE COMMON EMITTER CONFIGURATION	58	78	50
G 445	G3-18 DO YOU MEASURE CURRENT GAIN USED IN THE COMMON EMITTER CONFIGURATION	47	56	43
G 446	G3-19 DO YOU MEASURE POWER GAIN USED IN THE COMMON EMITTER CONFIGURATION	52	56	50
G 447	G3-20 DO YOU CALCULATE THE VOLTAGE GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE-EMITTER VOLTAGE INTO THE CHANGE THE BASE COLLECTOR VOLTAGE TO DETERMINE THE VOLTAGE GAIN	5	11	2
G 448	G3-21 DO YOU CALCULATE THE CURRENT GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE CURRENT INTO THE CHANGE IN COLLECTOR CURRENT TO DETERMINE THE CURRENT GAIN	5	11	2
G 449	G3-22 DO YOU CALCULATE THE POWER GAIN FOR A SPECIFIC TRANSISTOR USING A FORMULA THAT IS, DO YOU MULTIPLY THE CURRENT GAIN TIMES THE VOLTAGE GAIN TO DETERMINE THE POWER GAIN	7	6	7
G 450	G3-23 DO YOU NEED TO KNOW THAT MORE COLLECTOR CURRENT IS GENERATED WITH LESS COLLECTOR VOLTAGE AS TEMPERATURE INCREASES (THIS AFFECTS THE STATIC OPERATING POINT [Q] OF THE TRANSISTOR)	17	6	21
G 451	G3-24 DO YOU COMPUTE THE STATIC OPERATING POINT [Q] OF A TRANSISTOR AT DIFFERENT TEMPERATURES	3	0	5
G 452	G3-25 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH EMITTER (SWAMPING) RESISTOR STABILIZATION	35	44	31
G 453	G3-26 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH SELF-BIAS STABILIZATION	35	50	29

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280
G 454	G3-27 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH THERMISTOR STABILIZATION	28	39	24
G 455	G3-28 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH FORWARD BIAS DIODE STABILIZATION	33	50	26
G 456	G3-29 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH REVERSE BIAS DIODE STABILIZATION	35	56	26
G 457	G3-30 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH DOUBLE DIODE STABILIZATION	27	39	21
G 458	G3-31 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM EMITTER (SWAMPING) RESISTOR STABILIZATION	45	56	40
G 459	G3-32 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM SELF-BIAS STABILIZATION	45	61	38
G 460	G3-33 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM THERMISTOR STABILIZATION	35	44	31
G 461	G3-34 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM FORWARD BIAS DIODE STABILIZATION	45	56	40
G 462	G3-35 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM REVERSE BIAS DIODE STABILIZATION	45	61	38
G 463	G3-36 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM DOUBLE DIODE STABILIZATION	37	44	33
G 464	G3-37 DO YOU IDENTIFY AMPLITUDE DISTORTION FOR TRANSISTOR CIRCUITS	43	56	38
G 465	G3-38 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF AMPLITUDE DISTORTION	52	61	48
G 466	G3-39 DO YOU IDENTIFY FREQUENCY DISTORTION FOR TRANSISTOR CIRCUITS	50	67	43
G 467	G3-40 DO YOU IDENTIFY PHASE DISTORTION FOR TRANSISTOR CIRCUITS	42	39	43
G 468	G3-41 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF PHASE DISTORTION	40	39	40
G 469	G3-42 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF FREQUENCY DISTORTION	45	61	38
G 470	G3-43 DO YOU NEED TO KNOW THE DEGENERATIVE EFFECTS ON THE CIRCUIT CAUSED BY CHANGING EMITTER RESISTANCE FOR TRANSISTOR AMPLIFIERS IN THE COMMON COLLECTOR CONFIGURATION	18	28	14
G 471	G3-44 DO YOU DETERMINE THE CLASS OF OPERATION FOR AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	25	17	29
G 472	G3-45 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	38	39	38
G 473	G3-46 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	68	67	69
G 474	G3-47 DO YOU TROUBLESHOOT OR REPAIR COMPLEMENTARY SYMMETRY CIRCUITS	43	50	40
G 475	G3-48 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	62	72	57

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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                                GPSM15 PAGE  19

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                SPC  SPC  SPC
                      DY-TSK                                    276  279  280

G 476 G3-49 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED      63   67   62
        AMPLIFIERS
H 477 H1-01 DO YOU USE OR REFER TO VARACTORS                     58   94   43
H 478 H1-02 DO YOU USE OR REFER TO TUNNEL DIODES                 47   61   40     SOLID-STATE
H 479 H1-03 DO YOU USE OR REFER TO FIELD EFFECT TRANSISTORS (FET)50   67   43     SPECIAL PURPOSE
H 480 H1-04 DO YOU USE OR REFER TO UNIJUNCTION TRANSISTORS       62   78   55     DEVICES
H 481 H1-05 DO YOU USE OR REFER TO ZENER DIODES                  87  100   81
H 482 H1-06 DO YOU USE OR REFER TO INTEGRATED CIRCUITS           85  100   79
H 483 H2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH POWER SUPPLIES 82   89   79
H 484 H2-02 DO YOU INSPECT POWER SUPPLIES                        80   83   79
H 485 H2-03 DO YOU CLEAN POWER SUPPLIES                          78   83   76
H 486 H2-04 DO YOU ALIGN OR ADJUST POWER SUPPLIES                80   83   79      POWER SUPPLIES
H 487 H2-05 DO YOU TROUBLESHOOT TO POWER SUPPLY CIRCUIT LEVEL    77   83   74
H 488 H2-06 DO YOU TROUBLESHOOT TO POWER SUPPLY COMPONENTS       75   83   71
H 489 H2-07 DO YOU REMOVE OR REPLACE COMPLETE POWER SUPPLIES     77   83   74
H 490 H2-08 DO YOU REMOVE OR REPLACE POWER SUPPLY COMPONENTS     75   83   71
H 491 H2-09 DO YOU WORK WITH HALF-WAVE RECTIFIERS                72   78   69
H 492 H2-10 DO YOU WORK WITH FULL-WAVE RECTIFIERS OTHER THAN     73   89   67
        BRIDGE RECTIFIERS
H 493 H2-11 DO YOU WORK WITH BRIDGE RECTIFIERS                   78   89   74
H 494 H2-12 DO YOU WORK WITH THREE-PHASE RECTIFIERS              62   89   50
H 495 H2-13 DO YOU USE OR REFER TO INPUT VOLTAGE                 80   89   76
H 496 H2-14 DO YOU USE OR REFER TO INPUT FREQUENCY               67   72   64
H 497 H2-15 DO YOU USE OR REFER TO PEAK OUTPUT VOLTAGE           75   83   71
H 498 H2-16 DO YOU USE OR REFER TO AVERAGE OUTPUT VOLTAGE        77   89   71
H 499 H2-17 DO YOU USE OR REFER TO RIPPLE AMPLITUDE              77   83   74
H 500 H2-18 DO YOU USE OR REFER TO RIPPLE FREQUENCY              68   78   64
H 501 H2-19 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE52   83   38
H 502 H2-20 DO YOU USE OR REFER TO SHAPE OF OUTPUT WAVEFORMS     75   83   71
H 503 H2-21 DO YOU USE OR REFER TO EFFECTIVE OUTPUT VOLTAGE      72   83   67
H 504 H2-22 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE    72   78   69
        FILTERS
H 505 H2-23 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE     63   67   62
        FILTERS
H 506 H2-24 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE    63   67   62
        INPUT L-TYPE FILTERS
H 507 H2-25 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE     63   72   60
        INPUT L-TYPE FILTERS
H 508 H2-26 DO YOU WORK WITH CIRCUITS WHICH EMPLOY LC PI-TYPE    55   56   55
        FILTERS
H 509 H2-27 DO YOU WORK WITH CIRCUITS WHICH EMPLOY RC PI-TYPE    55   50   57
        FILTERS
H 510 H2-28 DO YOU WORK WITH CIRCUITS WHICH EMPLOY DON'T         17   22   14
        REMEMBER WHICH TYPE OF FILTER
H 511 H2-29 DO YOU HAVE THE OPTION OF REPLACING ONE TYPE OF       5   11    2
        FILTER WITH A DIFFERENT TYPE FILTER
H 512 H3-01 DO YOU WORK WITH OSCILLATORS IN YOUR PRESENT JOB     72   89   64
                                                                                  OSCILLATORS
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280
H 513 H3-02 DO YOU INSPECT OSCILLATORS	68	83	62
H 514 H3-03 DO YOU ALIGN OR ADJUST OSCILLATORS	68	89	60
H 515 H3-04 DO YOU REMOVE OR REPLACE COMPLETE OSCILLATORS	65	83	57
H 516 H3-05 DO YOU REMOVE OR REPLACE OSCILLATOR COMPONENTS	67	83	60
H 517 H3-06 DO YOU TROUBLESHOOT TO OSCILLATOR CIRCUIT LEVEL	68	83	62
H 518 H3-07 DO YOU TROUBLESHOOT TO OSCILLATOR COMPONENTS	68	83	62
H 519 H3-08 DO YOU USE OR REFER TO FEEDBACK	65	83	57
H 520 H3-09 DO YOU USE OR REFER TO FREQUENCY DETERMINING DEVICES (FDD)	55	83	43
H 521 H3-10 DO YOU USE OR REFER TO AMPLITUDE STABILITY	65	83	57
H 522 H3-11 DO YOU USE OR REFER TO FREQUENCY STABILITY	68	89	60
H 523 H3-12 DO YOU USE OR REFER TO DAMPING	48	67	40
H 524 H3-13 DO YOU USE OR REFER TO REGENERATIVE FEEDBACK	62	89	50
H 525 H3-14 DO YOU USE OR REFER TO PIEZOELECTRIC EFFECT	20	17	21
H 526 H3-15 DO YOU USE OR REFER TO CRITICAL DAMPING	18	28	14
H 527 H3-16 DO YOU USE OR REFER TO UNDER DAMPING	23	39	17
H 528 H3-17 DO YOU USE OR REFER TO OVER DAMPING	25	39	19
H 529 H3-18 DO YOU WORK WITH OSCILLATORS WHICH USE LC TANK CIRCUITS AS FDD	55	72	48
H 530 H3-19 DO YOU WORK WITH OSCILLATORS WHICH USE RC NETWORKS AS FDD	62	72	57
H 531 H3-20 DO YOU WORK WITH OSCILLATORS WHICH USE CRYSTALS AS FDD	70	83	64
H 532 H3-21 DO YOU WORK WITH OSCILLATORS WHICH USE DON'T REMEMBER WHICH TYPE OF FDD	13	17	12
H 533 H3-22 DO YOU WORK WITH SERIES HARTLEY SINUSOIDAL OSCILLATORS	33	44	29
H 534 H3-23 DO YOU WORK WITH SHUNT HARTLEY SINUSOIDAL OSCILLATORS	32	44	26
H 535 H3-24 DO YOU WORK WITH COLPITTS SINUSOIDAL OSCILLATORS	33	44	29
H 536 H3-25 DO YOU WORK WITH CLAPP SINUSOIDAL OSCILLATORS	27	39	21
H 537 H3-26 DO YOU WORK WITH BUTLER SINUSOIDAL OSCILLATORS	22	28	19
H 538 H3-27 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF OSCILLATORS	38	50	33
I 539 I1-01 DO YOU WORK WITH MULTIVIBRATORS IN YOUR PRESENT JOB	58	89	45
I 540 I1-02 DO YOU INSPECT WAVE GENERATING OR SHAPING CIRCUITS	55	83	43
I 541 I1-03 DO YOU ALIGN OR ADJUST WAVE GENERATING OR SHAPING CIRCUITS	55	83	43
I 542 I1-04 DO YOU CALIBRATE WAVE GENERATING OR SHAPING CIRCUITS	52	78	40
I 543 I1-05 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUITS	55	83	43
I 544 I1-06 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUIT COMPONENTS	53	83	40
I 545 I1-07 DO YOU REMOVE OR REPLACE COMPLETE WAVE GENERATING OR SHAPING CIRCUITS	52	83	38
I 546 I1-08 DO YOU REMOVE OR REPLACE WAVE GENERATING OR SHAPING COMPONENTS	53	83	40
I 547 I1-09 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN LC TANK CIRCUITS	38	67	26

MULTIVIBRATORS

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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                              SPC  SPC  SPC
                       DY-TSK                                 276  279  280

I 548 I1-10 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN RC   48   72   38
            NETWORKS
I 549 I1-11 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN      38   61   29
            CRYSTALS
I 550 I1-12 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN DON'T 18  22   17
            REMEMBER WHICH TYPE OF FDD
I 551 I1-13 DO YOU WORK WITH ASTABLE MULTIVIBRATORS            53   78   43
I 552 I1-14 DO YOU WORK WITH MONOSTABLE MULTIVIBRATORS         57   83   45
I 553 I1-15 DO YOU WORK WITH BISTABLE MULTIVIBRATORS           57   83   45
I 554 I1-16 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE          7   11    5
            MULTIVIBRATORS
I 555 I2-01 DO YOU WORK WITH LIMITERS OR CLAMPERS IN YOUR      67   89   57
            PRESENT JOB
I 556 I2-02 DO YOU WORK WITH SERIES DIODE LIMITERS             57   78   48     LIMITERS AND CLAMPERS
I 557 I2-03 DO YOU WORK WITH SHUNT DIODE LIMITERS              53   72   45
I 558 I2-04 DO YOU WORK WITH LIMITERS WITH BIAS                43   61   36
I 559 I2-05 DO YOU WORK WITH ZENER DIODE LIMITERS              57   78   48
I 560 I2-06 DO YOU WORK WITH TRANSISTOR LIMITERS               52   72   43
I 561 I2-07 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF LIMITERS 13   17   12
I 562 I2-08 DO YOU WORK WITH BASIC DIODE CLAMPING CIRCUITS     57   72   50
I 563 I2-09 DO YOU WORK WITH DIODE CLAMPING CIRCUITS WITH BIAS 50   67   43
I 564 I2-10 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF CLAMPING 12   17   10
            CIRCUIT
I 565 I3-01 IN YOUR PRESENT JOB, DO YOU WORK ON EQUIPMENT WHICH 78  89   74
            CONTAINS ELECTRON TUBES
I 566 I3-02 DO YOU CHECK ELECTRON TUBES TO SEE IF THEY ARE GOOD 67  78   62     ELECTRON TUBES
I 567 I3-03 DO YOU USE TUBE TESTERS TO CHECK ELECTRON TUBES    47   72   36
I 568 I3-04 DO YOU USE MULTIMETERS TO CHECK ELECTRON TUBES     62   67   60
I 569 I3-05 DO YOU USE SCOPES TO CHECK ELECTRON TUBES          60   83   50
I 570 I3-06 DO YOU USE SUBSTITUTION TO CHECK ELECTRON TUBES    77   83   74
I 571 I3-07 DO YOU USE OR REFER TO CUTOFF                      45   67   36
I 572 I3-08 DO YOU USE OR REFER TO PEAK INVERSE VOLTAGE RATING 22   22   21
I 573 I3-09 DO YOU USE OR REFER TO PEAK CURRENT RATING         23   22   24
I 574 I3-10 DO YOU USE OR REFER TO TRANSIT TIME                20   33   14
I 575 I3-11 DO YOU USE OR REFER TO PLATE DISSIPATION RATING    13   11   14
I 576 I3-12 DO YOU USE OR REFER TO SATURATION                  52   61   48
I 577 I3-13 DO YOU USE OR REFER TO DC PLATE RESISTANCE         32   50   24
I 578 I3-14 DO YOU COMPUTE ACTUAL VALUES OF THE DC PLATE        5    6    5
            RESISTANCE FOR ELECTRON TUBES
I 579 I3-15 DO YOU USE OR REFER TO PLATE VOLTAGE               77   89   71
I 580 I3-16 DO YOU USE OR REFER TO PLATE CURRENT               68   72   67
I 581 I3-17 DO YOU USE OR REFER TO GRID VOLTAGE                77   89   71
I 582 I3-18 DO YOU USE OR REFER TO GRID CURRENT                68   72   67
I 583 I3-19 DO YOU USE OR REFER TO CATHODE VOLTAGE             77   89   71
I 584 I3-20 DO YOU USE OR REFER TO CATHODE CURRENT             68   72   67
I 585 I3-21 DO YOU USE OR REFER TO THE TRIODE AMPLIFICATION    15   17   14
            FACTOR (THE AMPLIFICATION FACTOR FOR TRIODES IS DEFINED AS
            THE RATIO OF CHANGE IN PLATE VOLTAGE TO A CHANGE IN GRID
            VOLTAGE)
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280
I 586	I3-22 DO YOU CALCULATE ACTUAL VALUES OF TRIODE AMPLIFICATION FACTORS	7	11	5
I 587	I3-23 DO YOU USE OR REFER TO MULTIGRID (TETRODE, PENTODE, ETC) AMPLIFICATION FACTORS	17	22	14
I 588	I3-24 DO YOU USE OR REFER TO ELECTRON TUBE TRANSCONDUCTANCE (G, WHICH IS MEASURED IN MHOS)	8	11	7
I 589	I3-25 DO YOU CALCULATE ACTUAL VALUES OF ELECTRON TUBE TRANSCONDUCTANCES	3	6	2
I 590	I3-26 DO YOU USE OR REFER TO THE ELECTRON TUBE PARAMETER CALLED AC PLATE RESISTANCE	7	17	2
I 591	I3-27 DO YOU CALCULATE ACTUAL VALUES OF AC PLATE RESISTANCE	3	6	2
I 592	I3-28 DO YOU USE OR REFER TO ELECTRON TUBE INTERELECTRODE CAPACITANCE	13	22	10
I 593	I3-29 DO YOU USE OR REFER TO CHARACTERISTIC CURVES IN YOUR WORK WITH ELECTRON TUBES	5	6	5
I 594	I3-30 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE VOLTAGE FOR A SPECIFIED BIAS	5	0	7
I 595	I3-31 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE CURRENT FOR A SPECIFIED BIAS	5	0	7
I 596	I3-32 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR CUTOFF	8	0	12
I 597	I3-33 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR SATURATION	8	0	12
I 598	I3-34 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER GAIN	63	78	57
I 599	I3-35 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER EFFICIENCY	30	39	26
I 600	I3-36 DO YOU USE TEST TUBE CHECKERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	37	61	26
I 601	I3-37 DO YOU USE MULTIMETERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	40	72	26
I 602	I3-38 DO YOU USE OSCILLOSCOPES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	57	78	48
I 603	I3-39 DO YOU USE CHARACTERISTIC CURVES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	2	0	2
I 604	I3-40 DO YOU CALCULATE ANY ELECTRON TUBE CAPACITANCES SUCH AS INPUT CAPACITANCE	2	0	2
I 605	I3-41 DO YOU USE OR REFER TO TUBE SOCKET NOTATION	70	83	64
I 606	I3-42 DO YOU USE OR REFER TO PIN NUMBERING SYSTEMS	72	83	67
I 607	I3-43 DO YOU USE OR REFER TO THE TYPE OF MATERIAL OR THE OPERATING TEMPERATURE OF THE EMITTING SURFACE IN THE ELECTRON TUBES YOU WORK ON	10	6	12
I 608	I3-44 DO YOU USE OR REFER TO TUBE SUBSTITUTION MATERIAL SUCH AS MANUALS OR CHARTS	47	67	38
J 609	J1-01 DO YOU WORK WITH ELECTRON TUBE AMPLIFIERS OR CIRCUITS IN YOUR PRESENT JOB	70	89	62
J 610	J1-02 DO YOU DETERMINE THE CLASS OF OPERATION FOR ELECTRON TUBE AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	18	22	17

ELECTRON TUBE AMPLIFIERS
AND CIRCUITS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280	
J 611	J1-03 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	28	39	24	
J 612	J1-04 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	52	67	45	
J 613	J1-05 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	38	56	31	
J 614	J1-06 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	45	56	40	
J 615	J1-07 DO YOU TROUBLESHOOT OR REPAIR DON'T KNOW WHICH TYPE OF AMPLIFIER	25	28	24	
J 616	J2-01 DO YOU WORK WITH GAS TUBES (HOT CATHODE OR COLD CATHODE)	60	89	48	
J 617	J2-02 DO YOU WORK WITH CATHODE-RAY TUBES	50	89	33	SPECIAL PURPOSE ELECTRON TUBES
J 618	J2-03 DO YOU USE OR REFER TO THE CHARACTERISTICS OF BEAM POWER TUBES	20	50	7	
J 619	J2-04 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH BEAM POWER TUBES ARE USED	33	83	12	
J 620	J2-05 DO YOU USE OR REFER TO THE CHARACTERISTICS OF THYRATRONS	23	56	10	
J 621	J2-06 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH THYRATRONS ARE USED	38	83	19	
J 622	J2-07 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTRON GUNS OF CATHODE-RAY TUBES (CRT)	22	44	12	
J 623	J2-08 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROMAGNETIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	25	56	12	
J 624	J2-09 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROSTATIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	23	50	12	
J 625	J2-10 DO YOU USE OR REFER TO PHOSPHOR SCREENS	37	67	24	
J 626	J2-11 DO YOU USE OR REFER TO AQUADAG COATINGS	20	56	5	
J 627	J2-12 DO YOU USE OR REFER TO ELECTRON OPTICS	10	11	10	
J 628	J2-13 DO YOU USE OR REFER TO PERSISTENCE	28	50	19	
J 629	J2-14 DO YOU USE OR REFER TO DECAY TIMES	17	17	17	
J 630	J2-15 DO YOU USE OR REFER TO FLUORESCENCE	22	28	19	
J 631	J2-16 DO YOU USE OR REFER TO PHOSPHORESCENCE	32	61	19	
J 632	J3-01 DO YOU WORK ON TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	73	89	67	
J 633	J3-02 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	57	78	48	HETERODYNING, MODULATION, AND DEMODULATION
J 634	J3-03 DO YOU PERFORM TASKS ON FREQUENCY MIXERS	67	83	60	
J 635	J3-04 DO YOU USE OR REFER TO THE HETERODYNING OF SIGNALS IN YOUR WORK WITH TRANSMIT OR RECEIVE SYSTEMS	53	67	48	
J 636	J3-05 DO YOU PERFORM TASKS ON REACTANCE MODULATORS	27	56	14	
J 637	J3-06 DO YOU PERFORM TASKS ON MODULATED OSCILLATORS	42	72	29	
K 638	K1-01 DO YOU WORK ON AM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	20	44	10	
K 639	K1-02 DO YOU INSPECT AM TRANSMIT OR RECEIVE SYSTEMS	20	44	10	AM SYSTEMS
K 640	K1-03 DO YOU CLEAN AM TRANSMIT OR RECEIVE SYSTEMS	20	44	10	
K 641	K1-04 DO YOU ALIGN OR ADJUST AM TRANSMIT OR RECEIVE SYSTEMS	20	44	10	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280
K 642 K1-05 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE SYSTEMS	20	44	10
K 643 K1-06 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE COMPONENTS	20	44	10
K 644 K1-07 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE SYSTEMS	20	44	10
K 645 K1-08 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE COMPONENTS	20	44	10
K 646 K1-09 DO YOU PERFORM TASKS ON RF OSCILLATORS	20	44	10
K 647 K1-10 DO YOU PERFORM TASKS ON RF AMPLIFIERS	20	44	10
K 648 K1-11 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	10	22	5
K 649 K1-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	20	44	10
K 650 K1-13 DO YOU PERFORM TASKS ON LOCAL OSCILLATORS	20	44	10
K 651 K1-14 DO YOU PERFORM TASKS ON IF AMPLIFIERS	20	44	10
K 652 K1-15 DO YOU PERFORM TASKS ON DETECTORS	20	44	10
K 653 K1-16 DO YOU PERFORM TASKS ON DON'T REMEMBER WHICH AM STAGE	2	6	0
K 654 K1-17 DO YOU USE OR REFER TO AMPLITUDE STABILIZATION IN TRANSMITTERS	13	33	5
K 655 K1-18 DO YOU USE OR REFER TO FREQUENCY STABILIZATION IN TRANSMITTERS	20	44	10
K 656 K1-19 DO YOU USE OR REFER TO SENSITIVITY OF RECEIVERS	23	44	14
K 657 K1-20 DO YOU USE OR REFER TO SELECTIVITY OF RECEIVERS	22	44	12
K 658 K1-21 DO YOU USE OR REFER TO 2ND HARMONIC DISTORTION	7	17	2
K 659 K1-22 DO YOU USE OR REFER TO BANDPASS DISTORTION	20	44	10
K 660 K1-23 DO YOU USE OR REFER TO SQUARE LAW DISTORTION	0	0	0
K 661 K1-24 DO YOU USE OR REFER TO CO-CHANNEL INTERFERENCE	3	6	2
K 662 K1-25 DO YOU USE OR REFER TO IMAGE FREQUENCIES IN RECEIVERS	20	50	7
K 663 K1-26 DO YOU USE OR REFER TO SIGNAL TO IMAGE RATIOS OR IMAGE REJECTION RATIOS	13	39	2
K 664 K1-27 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM TRANSMITTER SCHEMATIC DIAGRAMS	18	44	7
K 665 K1-28 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM RECEIVER SCHEMATIC DIAGRAMS	20	44	10
K 666 K2-01 DO YOU WORK WITH FM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	25	39	19
K 667 K2-02 DO YOU INSPECT FM TRANSMIT OR RECEIVE SYSTEMS	28	39	24
K 668 K2-03 DO YOU CLEAN FM TRANSMIT OR RECEIVE SYSTEMS	28	39	24
K 669 K2-04 DO YOU ALIGN FM TRANSMIT OR RECEIVE SYSTEMS	28	39	24
K 670 K2-05 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE SYSTEMS	27	39	21
K 671 K2-06 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE COMPONENTS	27	39	21
K 672 K2-07 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE SYSTEMS	25	39	19
K 673 K2-08 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE COMPONENTS	27	39	21
K 674 K2-09 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	8	17	5
K 675 K2-10 DO YOU PERFORM TASKS ON FREQUENCY MULTIPLIERS	25	39	19

FM SYSTEMS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 276	SPC 279	SPC 280	
K 676	K2-11 DO YOU PERFORM TASKS ON DRIVERS (INTERMEDIATE AMPLIFIERS)	27	39	21	
K 677	K2-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	27	39	21	
K 678	K2-13 DO YOU PERFORM TASKS ON RF AMPLIFIERS	27	39	21	
K 679	K2-14 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	23	39	17	
K 680	K2-15 DO YOU PERFORM TASKS ON IF AMPLIFIERS	27	39	21	
K 681	K2-16 DO YOU PERFORM TASKS ON LIMITERS	22	39	14	
K 682	K2-17 DO YOU PERFORM TASKS ON FREQUENCY DISCRIMINATORS	18	39	10	
K 683	K2-18 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM TRANSMITTERS	23	39	17	
K 684	K2-19 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM RECEIVERS	23	39	17	
K 685	K3-01 DO YOU CONVERT DECIMAL (BASE 10) NUMBERS TO OCTAL (BASE 8) NUMBERS	58	72	52	
K 686	K3-02 DO YOU CONVERT DECIMAL NUMBERS TO BINARY (BASE 2) NUMBERS	57	67	52	NUMBERING SYSTEMS
K 687	K3-03 DO YOU CONVERT OCTAL NUMBERS TO DECIMAL NUMBERS	57	67	52	
K 688	K3-04 DO YOU CONVERT OCTAL NUMBERS TO BINARY NUMBERS	57	72	50	
K 689	K3-05 DO YOU CONVERT BINARY NUMBERS TO DECIMAL NUMBERS	57	72	50	
K 690	K3-06 DO YOU CONVERT BINARY NUMBERS TO OCTAL NUMBERS	55	72	48	
K 691	K3-07 DO YOU ADD BINARY NUMBERS TO GET A SUM	47	50	45	
K 692	K3-08 DO YOU SUBTRACT BINARY NUMBERS USING THE END-AROUND-CARRY METHOD	37	33	38	
K 693	K3-09 DO YOU SUBTRACT BINARY NUMBERS USING THE DIRECT SUBTRACTION METHOD	37	33	38	
K 694	K3-10 DO YOU ADD OCTAL NUMBERS TO GET A SUM	40	39	40	
L 695	L1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO LOGIC FUNCTIONS	55	89	40	
L 696	L1-02 DO YOU CONSTRUCT TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	37	72	21	LOGIC FUNCTIONS
L 697	L1-03 DO YOU CONSTRUCT TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	37	72	21	
L 698	L1-04 DO YOU CONSTRUCT TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	37	72	21	
L 699	L1-05 DO YOU CONSTRUCT TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS OR GATES	35	67	21	
L 700	L1-06 DO YOU USE OR REFER TO TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	47	72	36	
L 701	K1-07 DO YOU USE OR REFER TO TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	47	72	36	
L 702	K1-08 DO YOU USE OR REFER TO TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	47	72	36	
L 703	L1-09 DO YOU USE OR REFER TO TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS	43	61	36	
L 704	L1-10 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR AND GATES	57	94	40	
L 705	L1-11 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR OR GATES	57	94	40	
L 706	L1-12 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR NAND OR NOR GATES	57	94	40	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280
L 707 L1-13 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR EXCLUSIVE OR GATES	55	89	40
L 708 L2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO BOOLEAN EQUATIONS, LOGIC DIAGRAMS, OR LOGIC CIRCUITS	47	67	38
L 709 L2-02 DO YOU DRAW LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUITS	20	33	14
L 710 L2-03 DO YOU CONSTRUCT TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	10	28	2
L 711 L2-04 DO YOU DRAW LOGIC DIAGRAMS FROM GIVEN BOOLEAN EQUATIONS	18	39	10
L 712 L2-05 DO YOU MEASURE INPUTS OR OUTPUTS OF LOGIC GATES	45	61	38
L 713 L2-06 DO YOU DEVELOP OR ANALYZE BOOLEAN EQUATIONS IN THE PROCESS OF TROUBLESHOOTING DIGITAL CIRCUITS	23	33	19
L 714 L2-07 DO YOU ANALYZE LOGIC CIRCUITS BY USING BOOLEAN ALGEBRA	23	44	14
L 715 L2-08 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUIT GATES	40	50	36
L 716 L2-09 DO YOU USE OR REFER TO TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	20	28	17
L 717 L2-10 DO YOU USE OR REFER TO LOGIC DIAGRAMS CONSISTING OF MORE THAN ONE GATE	45	67	36
L 718 L2-11 DO YOU COMPUTE SUM AND CARRY EXPRESSIONS FOR SERIAL HALF OR FULL ADDER LOGIC DIAGRAMS	23	28	21
L 719 L2-12 DO YOU TRACE DATA FLOW THROUGH PARALLEL FULL ADDER LOGIC DIAGRAMS	35	50	29
L 720 L2-13 DO YOU WORK WITH ASTABLE (FREE RUNNING) MULTIVIBRATORS	45	61	38
L 721 L2-14 DO YOU WORK WITH BISTABLE (FLIP-FLOP) MULTIVIBRATORS	47	67	38
L 722 L2-15 DO YOU WORK WITH MONOSTABLE (ONE-SHOT) MULTIVIBRATORS	47	67	38
L 723 L2-16 DO YOU USE OR REFER TO FLIP-FLOP MULTIVIBRATOR SYMBOLS	48	67	40
L 724 L2-17 DO YOU USE OR REFER TO SINGLE-SHOT MULTIVIBRATOR SYMBOLS	48	67	40
L 725 L2-18 DO YOU USE OR REFER TO FLIP-FLOP CIRCUIT DIAGRAMS	47	61	40
L 726 L2-19 DO YOU USE OR REFER TO FLIP-FLOP TRUTH TABLES	38	56	31
L 727 L2-20 DO YOU USE OR REFER TO COMPLEMENTED FLIP-FLOP LOGIC SYMBOLS	47	67	38
L 728 L2-21 DO YOU USE OR REFER TO COMPLEMENTING FLIP-FLOP LOGIC SYMBOLS	47	67	38
L 729 L2-22 DO YOU MEASURE OUTPUT WAVESHAPES OF LOGIC CIRCUITS	45	61	38
L 730 L2-23 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTED FLIP-FLOP SCHEMATIC DIAGRAMS	45	67	36
L 731 L2-24 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTING FLIP-FLOP SCHEMATIC DIAGRAMS	45	67	36
L 732 L2-25 DO YOU CONSTRUCT TRUTH TABLES FOR J-K FLIP-FLOP LOGIC SYMBOLS	20	28	17

BOOLEAN EQUATIONS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280	
L 733 L3-01 DO YOU WORK WITH DIGITAL COUNTERS IN YOUR PRESENT JOB	53	89	38	
L 734 L3-02 DO YOU USE OR REFER TO UP-COUNTERS	52	89	36	
L 735 L3-03 DO YOU USE OR REFER TO DOWN-COUNTERS	52	89	36	COUNTERS
L 736 L3-04 DO YOU USE OR REFER TO SERIAL COUNTERS	53	89	38	
L 737 L3-05 DO YOU USE OR REFER TO PARALLEL COUNTERS	48	89	31	
L 738 L3-06 DO YOU USE OR REFER TO RING COUNTERS	23	39	17	
L 739 L3-07 DO YOU USE OR REFER TO DECADE COUNTERS	48	83	33	
L 740 L3-08 DO YOU USE OR REFER TO COUNT DETECT CIRCUITS	40	61	31	
L 741 L3-09 DO YOU USE OR REFER TO DOWN CLOCKS	50	89	33	
L 742 L3-10 DO YOU USE OR REFER TO UP CLOCKS	50	89	33	
L 743 L3-11 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	43	83	26	
L 744 L3-12 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	43	83	26	
L 745 L3-13 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF DECADE COUNTERS	47	83	31	
L 746 L3-14 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF RING COUNTERS	22	39	14	
L 747 L3-15 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTER	42	83	24	
L 748 L3-16 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	48	89	31	
L 749 L3-17 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF COUNTERS	35	56	26	
L 750 L3-18 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	33	61	21	
L 751 L3-19 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	37	61	26	
L 752 L3-20 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTERS	38	67	26	
L 753 L3-21 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR OTHER TYPES OF COUNTERS	32	50	24	
L 754 L3-22 DO YOU CONSTRUCT TRUTH TABLES FROM LOGIC DIAGRAMS OF DECADE COUNTERS	15	33	7	
L 755 L3-23 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP IN RING COUNTERS FOR SPECIFIC INPUT PULSES	20	33	14	
L 756 L3-24 DO YOU DETERMINE THE APPROPRIATE AND GATE NECESSARY IN COUNT DETECT CIRCUITS TO INDICATE A REQUIRED COUNT	35	67	21	
M 757 M1-01 DO YOU WORK WITH SAWTOOTH WAVE GENERATORS	58	83	48	
M 758 M1-02 DO YOU WORK WITH TRAPEZOIDAL WAVE GENERATORS	43	67	33	
M 759 M1-03 DO YOU WORK WITH PULSED OSCILLATORS WITH REGENERATIVE FEEDBACK	52	78	40	TIMING CIRCUITS
M 760 M1-04 DO YOU WORK WITH PULSED OSCILLATORS WITHOUT REGENERATIVE FEEDBACK	50	67	43	

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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                              SPC  SPC  SPC
                         DY-TSK                               276  279  280
M 761 M1-05 DO YOU WORK WITH BLOCKING OSCILLATORS              50   83   36
M 762 M1-06 DO YOU USE OR REFER TO RISE TIME                   78   89   74
M 763 M1-07 DO YOU USE OR REFER TO FALL OR FLYBACK TIME        75   89   69
M 764 M1-08 DO YOU USE OR REFER TO SWEEP TIME                  78   89   74
M 765 M1-09 DO YOU USE OR REFER TO ELECTRICAL LENGTH OF SAWTOOTH 58 78   50
          WAVEFORMS
M 766 M1-10 DO YOU USE OR REFER TO PHYSICAL LENGTH OF SAWTOOTH 52   78   40
          WAVEFORMS
M 767 M1-11 DO YOU USE OR REFER TO LINEAR SLOPE OF SAWTOOTH    52   78   40
          WAVEFORMS
M 768 M1-12 DO YOU USE OR REFER TO GATE LENGTH OF SAWTOOTH     58   89   45
          WAVEFORMS
M 769 M2-01 DO YOU USE SIGNAL GENERATORS IN YOUR PRESENT JOB   77   89   71
M 770 M2-02 DO YOU PERFORM OPERATIONAL CHECKS WHILE USING SIGNAL 77 89   71
          GENERATORS                                                          USE OF SIGNAL
M 771 M2-03 DO YOU PERFORM PERIODIC MAINTENANCE SUCH AS        72   72   71   GENERATORS
          ADJUSTING, ALIGNING, OR CALIBRATING WHILE USING SIGNAL
          GENERATORS
M 772 M2-04 DO YOU TROUBLESHOOT TO AN ASSEMBLY OR SUBASSEMBLY  68   72   67
          WHILE USING SIGNAL GENERATORS
M 773 M2-05 DO YOU TROUBLESHOOT TO THE SMALLEST REPLACEABLE    60   72   55
          COMPONENT WHILE USING SIGNAL GENERATORS
M 774 M2-06 DO YOU USE AUDIO SINE-WAVE GENERATORS              43   44   43
M 775 M2-07 DO YOU USE AUDIO NON-SINUSOIDAL WAVE GENERATORS SUCH 47 56   43
          AS SQUARE WAVE, TRIANGLE, PULSE, OR SPIKE
M 776 M2-08 DO YOU USE RF GENERATORS LESS THAN 1,000 MH        68   72   67
M 777 M2-09 DO YOU USE RF GENERATORS GREATER THAN 1,000 MH     47   83   31
M 778 M2-10 DO YOU USE OTHER SPECIAL PURPOSE OR MULTI-FUNCTION 68   83   62
          GENERATORS
M 779 M3-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING 55 89  40
          WITH ALTERNATING CURRENT OR DIRECT CURRENT MOTORS OR
          GENERATORS
M 780 M3-02 DO YOU INSPECT MOTORS                              52   78   40
M 781 M3-03 DO YOU CLEAN OR LUBRICATE MOTORS                   53   83   40   MOTORS AND GENERATORS
M 782 M3-04 DO YOU OPERATE MOTORS                              53   83   40
M 783 M3-05 DO YOU REMOVE OR REPLACE COMPLETE MOTORS           52   83   38
M 784 M3-06 DO YOU REMOVE OR REPLACE MOTOR PARTS               22   39   14
M 785 M3-07 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE        50   78   38
          CONNECTIONS OF MOTORS
M 786 M3-08 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF MOTORS 18 39  10
M 787 M3-09 DO YOU PERFORM ANY TASKS ON FIELD COILS             8   17    5
M 788 M3-10 DO YOU PERFORM ANY TASKS ON ARMATURES              10   17    7
M 789 M3-11 DO YOU PERFORM ANY TASKS ON ROTORS                 13   22   10
M 790 M3-12 DO YOU PERFORM ANY TASKS ON BRUSHES                23   56   10
M 791 M3-13 DO YOU PERFORM ANY TASKS ON SLIP RINGS             20   44   10
M 792 M3-14 DO YOU PERFORM ANY TASKS ON COMMUTATORS            15   33    7
M 793 M3-15 DO YOU PERFORM ANY TASKS ON POLE PIECES             8   17    5
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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                                  GPSM15 PAGE  29

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                      SPC  SPC  SPC
                         DY-TSK                                       276  279  280

M 794 M3-16 DO YOU DETERMINE OR MEASURE THE MAGNITUDE OF THE            7   22    0
            FORCE OR TORQUE CREATED BY A MOTOR
M 795 M3-17 DO YOU DETERMINE OR MEASURE THE DIRECTION OF THE           10   22    5
            MECHANICAL FORCE OR TORQUE CREATED BY A MOTOR
M 796 M3-18 DO YOU DETERMINE OR MEASURE THE MAGNITUDE                   7   11    5
            OR DIRECTION OF THE INDUCED VOLTAGE IN MOTORS
M 797 M3-19 DO YOU WORK WITH SYNCHRONOUS MOTORS                        27   67   10
M 798 M3-20 DO YOU WORK WITH INDUCTION MOTORS                          33   72   17
M 799 M3-21 DO YOU WORK WITH SPLIT-PHASE MOTORS                        23   39   17
M 800 M3-22 DO YOU WORK WITH SOME COMBINATION OF THE ABOVE MOTORS      37   56   29
M 801 M3-23 DO YOU INSPECT GENERATORS                                  20   61    2
M 802 M3-24 DO YOU CLEAN OR LUBRICATE GENERATORS                       17   50    2
M 803 M3-25 DO YOU OPERATE GENERATORS                                  17   44    5
M 804 M3-26 DO YOU REMOVE OR REPLACE COMPLETE GENERATORS               20   61    2
M 805 M3-27 DO YOU REMOVE OR REPLACE GENERATOR PARTS                   12   33    2
M 806 M3-28 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE                20   61    2
            CONNECTIONS OF GENERATORS
M 807 M3-29 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF             12   33    2
            GENERATORS
N 808 N1-01 DO YOU WORK WITH METERS IN YOUR PRESENT JOB                78   89   74
N 809 N1-02 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF          15   17   14
            PERMANENT MAGNETS
N 810 N1-03 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF          17   17   17       METER MOVEMENTS
            MOVING COILS
N 811 N1-04 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF          17   17   17
            SPIRAL SPRINGS
N 812 N1-05 DO YOU READ METER SCALES                                   75   89   69
N 813 N1-06 DO YOU EXTEND THE RANGE OF AMMETERS                        40   39   40
N 814 N1-07 DO YOU ZERO OHMMETERS                                      72   83   67
N 815 N1-08 DO YOU ZERO AMMETERS                                       60   72   55
N 816 N1-09 DO YOU EXTEND THE RANGE OF VOLTMETERS                      50   50   50
N 817 N1-10 DO YOU USE OR REFER TO VOLTMETER SENSITIVITY               38   61   29
            (EXPRESSED IN UNITS OF OHMS PER VOLT)
N 818 N2-01 DO YOU WORK WITH SATURABLE REACTORS OR MAGNETIC            35   89   12
            AMPLIFIERS IN YOUR PRESENT JOB
N 819 N2-02 DO YOU INSPECT MAGNETIC AMPLIFIERS OR SATURABLE            32   83   10
            REACTORS                                                                        SATURABLE REACTORS AND MAGNETIC
N 820 N2-03 DO YOU CLEAN MAGNETIC AMPLIFIERS OR SATURABLE              30   83    7       AMPLIFIERS
            REACTORS
N 821 N2-04 DO YOU ADJUST MAGNETIC AMPLIFIERS OR SATURABLE             27   67   10
            REACTORS
N 822 N2-05 DO YOU TROUBLESHOOT MAGNETIC AMPLIFIERS OR SATURABLE       30   83    7
            REACTORS
N 823 N2-06 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIERS OR            32   83   10
            SATURABLE REACTORS
N 824 N2-07 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIER OR             22   67    2
            SATURABLE REACTOR COMPONENTS
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TASK  GROUP SUMMARY
PERCENT MEMBERS PERFORMING
                                                                     SPC  SPC  SPC
                   DY-TSK                                            276  279  280
N 825 N2-08 DO YOU USE OR REFER TO HYSTERESIS CURVES OR LOOPS          2    6    0
N 826 N2-09 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT     15   50    0
      WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF
      SINGLE WINDING SATURABLE REACTORS
N 827 N2-10 DO YOU MEASURE OUTPUT WAVEFORMS ACROSS REACTOR            17   50    2
      WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE
      REACTORS
N 828 N2-11 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT     20   50    7
      WAVEFORMS FOR MAGNETIC AMPLIFIERS
N 829 N2-12 DO YOU USE OR REFER TO COERCIVE FORCE IN SATURABLE         2    0    2
      REACTORS
N 830 N2-13 DO YOU USE OR REFER TO RESIDUAL MAGNETISM IN               7   17    2
      SATURABLE REACTORS
N 831 N2-14 DO YOU USE OR REFER TO FLUX DENSITY IN SATURABLE           2    0    2
      REACTORS
N 832 N2-15 DO YOU USE OR REFER TO POINT OF SATURATION IN              8   17    5
      SATURABLE REACTORS
N 833 N2-16 DO YOU USE OR REFER TO SATURABLE REACTOR SCHEMATIC        28   78    7
      SYMBOLS
N 834 N3-01 DO YOU WORK WITH WAVESHAPING CIRCUITS IN YOUR PRESENT     70   89   62
      JOB
N 835 N3-02 DO YOU USE OR REFER TO TRANSIENT INTERVALS                48   50   48
N 836 N3-03 DO YOU USE OR REFER TO PULSE WIDTH (PW)                   70   89   62      WAVESHAPING CIRCUITS
N 837 N3-04 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)        72   89   64
N 838 N3-05 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY         72   89   64
      (PRF)
N 839 N3-06 DO YOU USE OR REFER TO DIFFERENTIATING CIRCUITS           65   89   55
N 840 N3-07 DO YOU USE OR REFER TO INTEGRATING CIRCUITS               65   89   55
N 841 N3-08 DO YOU USE OR REFER TO THE CLASSIFICATION OF TIME         42   56   36
      CONSTANTS (TC) AS LONG, MEDIUM, OR SHORT
N 842 N3-09 DO YOU DETERMINE WHETHER AN LR OR RC CIRCUIT IS           25   44   17
      DIFFERENTIATING OR INTEGRATING BASED ON THE TIME CONSTANT
      AND OUTPUT CONFIGURATION
N 843 N3-10 DO YOU WORK WITH SQUARE WAVE GENERATORS                   62   78   55
N 844 N3-11 DO YOU WORK WITH RECTANGULAR WAVE GENERATORS              52   56   50
O 845 O1-01 DO YOU WORK ON SINGLE SIDEBAND SYSTEMS IN YOUR            23   78    0
      PRESENT JOB
O 846 O1-02 DO YOU INSPECT SSB TRANSMIT OR RECEIVE SYSTEMS            23   78    0
O 847 O1-03 DO YOU CLEAN SSB TRANSMIT OR RECEIVE SYSTEMS              22   72    0      SINGLE SIDEBAND SYSTEMS
O 848 O1-04 DO YOU ALIGN SSB TRANSMIT OR RECEIVE SYSTEMS              23   78    0
O 849 O1-05 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE            22   72    0
      SYSTEMS
O 850 O1-06 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE            22   72    0
      COMPONENTS
O 851 O1-07 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE          22   72    0
      SYSTEMS
O 852 O1-08 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE          22   72    0
      COMPONENTS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                               SPC  SPC  SPC
                   DY-TSK                                      276  279  260

0 853 01-09 DO YOU PERFORM TASKS ON SSB AUDIO AMPLIFIERS         3   11    0
0 854 01-10 DO YOU PERFORM TASKS ON SSB BALANCED MODULATORS      8   28    0
0 855 01-11 DO YOU PERFORM TASKS ON SSB CARRIER OSCILLATORS     15   50    0
0 856 01-12 DO YOU PERFORM TASKS ON SSB LC FILTERS              18   61    0
0 857 01-13 DO YOU PERFORM TASKS ON SSB CRYSTAL FILTERS         17   56    0
0 858 01-14 DO YOU PERFORM TASKS ON SSB MECHANICAL FILTERS      15   50    0
0 859 01-15 DO YOU PERFORM TASKS ON SSB OSCILLATORS             22   72    0
0 860 01-16 DO YOU PERFORM TASKS ON SSB MIXERS                  20   67    0
0 861 01-17 DO YOU PERFORM TASKS ON SSB DRIVERS                 18   61    0
0 862 01-18 DO YOU PERFORM TASKS ON SSB POWER AMPLIFIERS        20   67    0
0 863 01-19 DO YOU PERFORM TASKS ON SSB RF AMPLIFIERS           20   67    0
0 864 01-20 DO YOU PERFORM TASKS ON SSB FREQUENCY CONVERTERS    17   56    0
0 865 01-21 DO YOU PERFORM TASKS ON SSB IF AMPLIFIERS           22   72    0
0 866 01-22 DO YOU PERFORM TASKS ON SSB DEMODULATORS            13   44    0
0 867 01-23 DO YOU PERFORM TASKS ON SSB DON'T REMEMBER WHICH SSB  5   17    0
        SYSTEM STAGES
0 868 01-24 DO YOU USE OR REFER TO SELECTIVE FADING              2    6    0
0 869 01-25 DO YOU USE OR REFER TO PEAK POWER                   18   61    0
0 870 01-26 DO YOU USE OR REFER TO FREQUENCY STABILITY          20   67    0
0 871 01-27 DO YOU USE OR REFER TO RESPONSE CURVES FOR          15   50    0
        BANDWIDTH FILTERS
0 872 01-28 DO YOU CALCULATE PEAK POWER OR EFFECTIVE POWER OF SSB  17   56    0
        TRANSMITTERS
0 873 01-29 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB   22   72    0
        TRANSMITTER SCHEMATIC DIAGRAMS
0 874 01-30 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB   12   39    0
        RECEIVER SCHEMATIC DIAGRAMS
0 875 02-01 DO YOU WORK ON PULSE MODULATION SYSTEMS IN YOUR     67   89   57
        PRESENT JOB
0 876 02-02 DO YOU INSPECT PULSE MODULATION SYSTEMS             68   89   60     PULSE MODULATION SYSTEMS
0 877 02-03 DO YOU CLEAN PULSE MODULATION SYSTEMS               65   83   57
0 878 02-04 DO YOU ALIGN PULSE MODULATION SYSTEMS               68   89   60
0 879 02-05 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEMS     67   83   60
0 880 02-06 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEM      67   83   60
        COMPONENTS
0 881 02-07 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEMS   58   78   50
0 882 02-08 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEM    67   83   60
        COMPONENTS
0 883 02-09 DO YOU WORK ON PULSE-AMPLITUDE MODULATION (PAM)     42   44   40
        SYSTEMS
0 884 02-10 DO YOU WORK ON PULSE-DURATION MODULATION (PDM)      37   50   31
        SYSTEMS
0 885 02-11 DO YOU WORK ON PULSE-POSITION MODULATION (PPM)      17   22   14
        SYSTEMS
0 886 02-12 DO YOU WORK ON PULSE-CODE MODULATION (PCM) SYSTEMS  10   11   10
0 887 02-13 DO YOU WORK ON LINE PULSING MODULATION SYSTEMS      13   22   10
0 888 02-14 DO YOU WORK ON DON'T REMEMBER WHICH TYPE OF         27   28   26
        MODULATION SYSTEM
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                                    SPC  SPC  SPC
                      DY-TSK                                        276  279  280

0 889 02-15 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          67   89   57
        POWER SUPPLIES
0 890 02-16 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          48   83   33
        CHARGING CHOKES AND CHARGING DIODES
0 891 02-17 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          55   83   43
        PULSE FORMING NETWORKS
0 892 02-18 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          42   72   29
        TIMERS
0 893 02-19 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          48   83   33
        SWITCHES SUCH AS GAS THYRATRONS
0 894 02-20 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          53   83   40
        PULSE TRANSFORMERS
0 895 02-21 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          58   89   45
        TRANSMITTER TUBES
0 896 02-22 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM RF       62   83   52
        AMPLIFIERS
0 897 02-23 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          47   56   43
        FREQUENCY CONVERTERS
0 898 02-24 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          57   78   48
        IF AMPLIFIERS
0 899 02-25 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          57   72   50
        DETECTORS
0 900 02-26 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          48   67   40
        VIDEO AMPLIFIERS
0 901 02-27 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM          29   39   24
        POWER VIDEO AMPLIFIERS
0 902 02-28 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM           8   11    7
        DON'T REMEMBER WHICH PULSE MODULATION SYSTEM STAGES
0 903 02-29 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY        67   89   57
        (PRF)
0 904 02-30 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)       67   89   57
0 905 02-31 DO YOU USE OR REFER TO PULSE WIDTH (PW)                  68   89   60
0 906 02-32 DO YOU USE OR REFER TO PULSE SHAPE                       68   89   60
0 907 02-33 DO YOU USE OR REFER TO PEAK POWER                        60   89   48
0 908 02-34 DO YOU USE OR REFER TO AVERAGE POWER                     60   89   48
0 909 02-35 DO YOU CALCULATE PULSE RECURRENCE TIME (PRT) OR PULSE    60   78   52
        RECURRENCE FREQUENCY (PRF)
0 910 02-36 DO YOU MEASURE PULSE RECURRENCE TIME (PRT) OR PULSE      67   89   57
        RECURRENCE FREQUENCY (PRF)
0 911 02-37 DO YOU USE FORMULAS TO CALCULATE AVERAGE POWER OR        48   89   31
        PEAK POWER OF PULSE MODULATION TRANSMIT SYSTEMS
0 912 02-38 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE      63   89   52
        MODULATION TRANSMITTER SCHEMATIC DIAGRAMS
0 913 02-39 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE      48   72   38
        MODULATION RECEIVER SCHEMATIC DIAGRAMS
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0 914 03-01 DO YOU WORK WITH ANTENNAS IN YOUR PRESENT JOB            35   89   12
0 915 03-02 DO YOU INSPECT ANTENNAS                                  32   83   10       ANTENNAS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                    SPC  SPC  SPC
                     DY-TSK                                         276  279  280

0 916 03-03 DO YOU CLEAN ANTENNAS                                    30   83    7
0 917 03-04 DO YOU PHYSICALLY ALIGN ANTENNAS                         25   72    5
0 918 03-05 DO YOU ELECTRICALLY ALIGN ANTENNAS                       22   61    5
0 919 03-06 DO YOU TROUBLESHOOT TO ANTENNAS                          30   83    7
0 920 03-07 DO YOU TROUBLESHOOT TO ANTENNA COMPONENTS                27   83    2
0 921 03-08 DO YOU REMOVE OR INSTALL ANTENNAS                        10   22    5
0 922 03-09 DO YOU REMOVE OR REPLACE COMPONENTS OF ANTENNAS          25   78    2
0 923 03-10 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING          3   11    0
       REPRESENTATIONS OF E OR ELECTRIC FIELD LINES
0 924 03-11 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING          0    0    0
       REPRESENTATIONS OF H OR MAGNETIC FIELD LINES
0 925 03-12 DO YOU DETERMINE THE DIRECTION OF THE MAGNETIC LINES      2    0    2
       IN RELATION TO THE ELECTRIC LINES OF FORCE FOR ANTENNAS
0 926 03-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT              0    0    0
       ANTENNAS WHICH ARE OF CORRECT LENGTH (HALF-WAVE) ACT AS
       INDUCTIVE LOADS TO THE GENERATOR
0 927 03-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS     2    0    2
       WHICH ARE LONGER THAN A HALF-WAVE ACT AS INDUCTIVE LOADS
       TO THE GENERATOR
0 928 03-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS     2    0    2
       WHICH ARE SHORTER THAN A HALF-WAVE ACT AS CAPACITIVE LOADS
       TO THE GENERATOR
0 929 03-16 DO YOU WORK WITH HERTZ ANTENNAS                           3    6    2
0 930 03-17 DO YOU WORK WITH MARCONI ANTENNAS                         2    0    2
0 931 03-18 DO YOU WORK WITH BROADSIDE ARRAYS                         3    6    2
0 932 03-19 DO YOU WORK WITH END-FIRE ARRAYS                          3    0    5
0 933 03-20 DO YOU WORK WITH CARDIOID ARRAYS                          3    6    2
0 934 03-21 DO YOU WORK WITH COLLINEAR ARRAYS                         7   17    2
0 935 03-22 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC           2    6    0
       INDUCTION FIELDS WHEN WORKING WITH ANTENNAS
0 936 03-23 DO YOU MEASURE ELECTROMAGNETIC INDUCTION FIELDS OF        0    0    0
       ANTENNAS
0 937 03-24 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC           7   22    0
       RADIATION FIELDS WHEN WORKING WITH ANTENNAS
0 938 03-25 DO YOU MEASURE ELECTROMAGNETIC RADIATION                  0    0    0
       FIELDS OF ANTENNAS
0 939 03-26 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E)     0    0    0
       AND MAGNETIC (H) COMPONENTS IN ANTENNA RADIATION
0 940 03-27 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E)     0    0    0
       AND MAGNETIC (H) COMPONENTS IN ANTENNA INDUCTION FIELD
0 941 03-28 ARE ANY OF THE ANTENNAS YOU WORK ON LINEARLY             12   17   10
       POLARIZED
0 942 03-29 ARE ANY OF THE ANTENNAS YOU WORK ON CIRCULARLY            7   22    0
       POLARIZED
0 943 03-30 DO YOU MEASURE OR DETERMINE THE POLARITY OF ANTENNAS      2    0    2
       YOU WORK ON
0 944 03-31 DO YOU CONSTRUCT, OR MAKE THE CALCULATIONS                0    0    0
       NECESSARY TO CONSTRUCT, ANTENNAS OF CORRECT LENGTH FOR
       SPECIFIC WAVELENGTHS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                               SPC  SPC  SPC
                      DY-TSK                                   276  279  280
0 945 03-32 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC  7   11    5
      ELEMENTS
0 946 03-33 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC  7   11    5
      ELEMENTS SERVING AS DIRECTORS
0 947 03-34 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC  8   22    2
      ELEMENTS SERVING AS REFLECTORS
0 948 03-35 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN DON'T     10   17    7
      REMEMBER WHAT KIND OF ELEMENTS
0 949 03-36 DO YOU WORK ON UNIDIRECTIONAL ANTENNAS                23   56   10
0 850 03-37 DO YOU WORK ON BIDIRECTIONAL ANTENNAS                  5    6    5
0 851 03-38 DO YOU WORK ON DON'T REMEMBER THE DIRECTIONALITY       5   11    2
0 852 03-39 DO YOU WORK WITH ROTAR ANTENNA ARRAYS                 13   39    2
P 953 P1-01 IN YOUR PRESENT JOB DO YOU WORK WITH TRANSMISSION     40   61   31
      LINES (TRANSMISSION LINES ARE DEFINED TO INCLUDE LEADS                      TRANSMISSION LINES
      BETWEEN RECEIVERS AND ANTENNAS, TELEPHONE LEADS, AS WELL
      AS HIGH VOLTAGE POWER LINES, ETC.  DO NOT CONSIDER
      WAVEGUIDES AS TRANSMISSION LINES
P 954 P1-02 DO YOU REFER TO OR USE COPPER LOSS OR I2R LOSS IN      8   11    7
      TRANSMISSION LINES
P 955 P1-03 DO YOU REFER TO OR USE SKIN EFFECTS OF HIGH FREQUENCY  3    6    2
      CURRENTS IN TRANSMISSION LINES
P 956 P1-04 DO YOU REFER TO OR USE RADIATION LOSS IN TRANSMISSION 13   28    7
      LINES
P 957 P1-05 DO YOU USE OR REFER TO DIELECTRIC LOSS IN              8    6   10
      TRANSMISSION LINES
P 958 P1-06 DO YOU USE OR REFER TO LEAKAGE LOSSES IN TRANSMISSION  8    6   10
      LINES
P 959 P1-07 DO YOU WORK WITH TWISTED PAIR TRANSMISSION LINES      13   28    7
P 960 P1-08 DO YOU WORK WITH TWIN LEAD TRANSMISSION LINES         17   39    7
P 961 P1-09 DO YOU WORK WITH OPEN TWO-WIRE TRANSMISSION LINES     13   28    7
P 962 P1-10 DO YOU WORK WITH FLEXIBLE COAXIAL CABLE TRANSMISSION  40   61   31
      LINES
P 963 P1-11 DO YOU WORK WITH RIGID COAXIAL CABLE TRANSMISSION     37   61   26
      LINES
P 964 P1-12 DO YOU TROUBLESHOOT TRANSMISSION LINES                38   61   29
P 965 P1-13 DO YOU ANALYZE VOLTAGE OR CURRENT WAVEFORMS IN        12    6   14
      TRANSMISSION LINES TO DETERMINE THE TYPE OF TERMINATION
      (OPEN, SHORTED, CAPACITIVE, INDUCTIVE)
P 966 P1-14 DO YOU SELECT APPPOPRIATE TRANSMISSION LINES          25   28   24
      TERMINATIONS TO ACHIEVE DESIRED WAVEFORMS
P 967 P1-15 DO YOU USE OR REFER TO SCHEMATIC SYMBOLS FOR LINE     33   50   26
      TERMINATIONS IN TERMS OF CIRCUIT TERMINATIONS
P 968 P1-16 DO YOU MEASURE STANDING WAVE RATIOS (SR) OF           27   28   26
      TRANSMISSION LINES
P 969 P1-17 DO YOU CALCULATE STANDING WAVE RATIOS (SWR) OF        13   17   12
      TRANSMISSION LINES
P 970 P1-18 DO YOU PERFORM THE CALCULATIONS NECESSARY TO           3    0    5
      DETERMINE THE IMPEDANCE AND LENGTH OF QUARTER - WAVELENGTH
      MATCHING TRANSFORMERS TO MATCH TRANSMISSION LINES TO LOADS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                     SPC  SPC  SPC
                         DY-TSK                                      276  279  280

P 971 P1-19 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED     15   22   12
            TO LOADS USING MATCHING TRANSFORMERS
P 972 P1-20 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED      8   11    7
            TO LOADS USING DELTA MATCHING
P 973 P1-21 DO YOU SELECT THE TYPE OF TRANSMISSION LINE NEEDED         8    6   10
            FOR PARTICULAR JOBS WITHOUT REFERRING TO TECHNICAL DATA
P 974 P1-22 DO YOU USE OR REFER TO THE TERM CHARACTERISTIC            23   17   26
            IMPEDANCE (Z0) OF TRANSMISSION LINES
P 975 P1-23 DO YOU CALCULATE THE CHARACTERISTIC IMPEDANCE (Z0) OF      2    0    2
            TRANSMISSION LINES
P 976 P1-24 DO YOU USE OR REFER TO THE TERM CUTOFF FREQUENCY OF        3    0    5
            TRANSMISSION LINES
P 977 P1-25 DO YOU USE OR REFER TO THE TERM VELOCITY FACTOR (K)        2    0    2
            OF TRANSMISSION LINES
P 978 P1-26 DO YOU COMPUTE THE ELECTRICAL LENGTH OF TRANSMISSION      18    6   24
            LINES FOR PARTICULAR FREQUENCIES
P 979 P1-27 DO YOU CONSTRUCT TRANSMISSION LINES OF PARTICULAR         20    6   26
            ELECTRICAL LENGTH FOR GIVEN FREQUENCIES
P 980 P1-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT AS THE       15    6   19
            FREQUENCY INCREASES AND THE PHYSICAL LENGTH OF
            TRANSMISSION LINES REMAIN CONSTANT, THE ELECTRICAL LENGTH
            INCREASES
P 981 P1-29 DO YOU WORK WITH NONRESONANT (FLAT) TRANSMISSION          10   11   10
            LINES
P 982 P1-30 DO YOU WORK WITH RESONANT TRANSMISSION LINES              15   17   14
P 983 P1-31 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED      5    6    5
            TO LOADS USING STUB MATCHING
P 984 P2-01 DO YOU WORK WITH WAVEGUIDES OR CAVITY RESONATORS IN       40   89   19
            YOUR PRESENT JOB                                                             WAVEGUIDES AND CAVITY RESONATORS
P 985 P2-02 DO YOU INSPECT WAVEGUIDES OR CAVITY RESONATORS            40   83   21
P 986 P2-03 DO YOU CLEAN WAVEGUIDES OR CAVITY RESONATORS              37   83   17
P 987 P2-04 DO YOU BEND WAVEGUIDES OR CAVITY RESONATORS                3    6    2
P 988 P2-05 DO YOU TWIST WAVEGUIDES OR CAVITY RESONATORS               3    6    2
P 989 P2-06 DO YOU PRESSURIZE WAVEGUIDES OR CAVITY RESONATORS         27   83    2
P 990 P2-07 DO YOU PURGE WAVEGUIDES OR CAVITY RESONATORS              25   78    2
P 991 P2-08 DO YOU TROUBLESHOOT WAVEGUIDES OR CAVITY RESONATORS       37   78   19
P 992 P2-09 DO YOU REMOVE OR INSTALL COMPLETE WAVEGUIDES              18   61    0
P 993 P2-10 DO YOU REMOVE OR INSTALL WAVEGUIDE SECTIONS               25   83    0
P 994 P2-11 DO YOU REMOVE OR INSTALL DUMMY LOADS                      30   78   10
P 995 P2-12 DO YOU REMOVE OR INSTALL E BENDS                          15   50    0
P 996 P2-13 DO YOU REMOVE OR INSTALL H BENDS                          15   50    0
P 997 P2-14 DO YOU REMOVE OR INSTALL OTHER BENDS                      13   44    0
P 998 P2-15 DO YOU REMOVE OR INSTALL CHOKE JOINTS                     17   56    0
P 999 P2-16 DO YOU REMOVE OR INSTALL ROTATING JOINTS                  25   83    0
P1000 P2-17 DO YOU REMOVE OR INSTALL DIRECTIONAL COUPLERS             30   78   10
P1001 P2-18 DO YOU REMOVE OR INSTALL BIDIRECTIONAL COUPLERS           28   78    7
P1002 P2-19 DO YOU USE OR REFER TO >A> WALL OF WAVEGUIDES              8   22    2
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 TASK  GROUP SUMMARY
 PEPCENT MEMBERS PERFORMING

                                                             SPC  SPC  SPC
                          DY-TSK                             276  279  280

P1003 P2-20 DO YOU USE OR REFER TO >B> WALL OF WAVEGUIDES      8   22    2
P1004 P2-21 DO YOU USF OR REFER TO CUTOFF FREQUFNCY OF WAVEGUIDES  2    6    0
P1005 P2-22 DO YOU USE OR REFER TO FREGUENCY-DETERMINING WALL OF   3   11    0
        WAVEGUIDES
P1006 P2-23 DO YOU USE OR REFER TO POWER-DETERMINING WALL OF    3   11    0
        WAVEGUIDES
P1007 P2-24 DO YOU USE OR REFER TO ELECTRIC FIELD BOUNDARY      0    0    0
        CONDITIONS
P1008 P2-25 DO YOU USE OR REFER TO MAGNETIC FIELD BOUNDARY      0    0    0
        CONDITIONS
P1009 P2-26 DO YOU USE OR REFER TO DUPLEXER FIELD BOUNDARY      0    0    0
        CONDITIONS
P1010 P2-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST   5   17    0
        WAVEGUIDES ARE MADE WITH A >B> WALL SIZE OF .7 WAVELENGTHS
        OF THE OPERATING FREQUENCY
P1011 P2-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST >A>  2    6    0
        WALLS RANGE FROM .2 TO .5 WAVELENGTHS IN SIZE, WITH .35
        USED AS AN AVERAGE
P1012 P2-29 ARE YOU CONCERNED WITH THE MATERIAL (SUCH AS BRASS)  3   11    0
        WHICH WAVEGUIDES ARE MADE OF
P1013 P2-30 DO YOU COMPUTE THE LENGTH OF A WAVEGUIDE FOR SPECIFIC  0    0    0
        INSTALLATION
P1014 P2-31 DO YOU USE THE RIGHT HAND RULE TO DETERMINE THE     0    0    0
        DIRECTION OF PROPAGATION, DIRECTION OF >E> FIELD, OR
        DIPECTION OF >H> FIELD IN WAVEGUIDES
P1015 P2-32 DO YOU USE OR REFER TO THE TIME PHASE OF PEAK >E> OP  0    0    0
        >H> LINES IN WAVEGUIDES
P1016 P2-33 DO YOU MEASURE THE TIME PHASE OF >E> OR >H> LINES IN  0    0    0
        WAVEGUIDES
P1017 P2-34 DO YOU USE OR REFER TO THE SPACE QUADRATURE OF >E> OR  0    0    0
        >H> LINES IN WAVEGUIDES
P1018 P2-35 ARE HIGH POWER PROBES USED ON WAVEGUIDES OR CAVITY  20   50    7
        RESONATORS YOU WORK WITH
P1019 P2-36 ARE LOW POWER PROBES USED ON WAVEGUIDES OR CAVITY   22   61    5
        RESONATORS YOU WORK WITH
P1020 P2-37 ARE LOOPS USED ON WAVEGUIDES OR CAVITY RESONATORS   15   28   10
        YOU WORK WITH
P1021 P2-38 ARE APERTURES (WINDOWS OR IRISES) USED ON WAVEGUIDES  23   78    0
        OR CAVITY RESONATORS YOU WORK WITH
P1022 P2-39 ARE DON'T REMEMBER THE KIND OF ENERGY COUPLING USED   8   11    7
        ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH
P1023 P2-40 DO YOU DETERMINE WHERE PROBES SHOULD BE MOUNTED IN  0    0    0
        WAVEGUIDES OR CAVITY RESONATORS WITHOUT PEFERRING TO
        TECHNICAL DATA
P1024 P2-41 DO YOU DETERMINE THE POSITIONING OF LOOPS IN        0    0    0
        WAVEGUIDES OR CAVITY RESONATORS WITHOUT PEFERRING TO
        TECHNICAL DATA
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280
P1025 P2-42 DO YOU DETERMINE THE POSITIONING OR SIZE OF APERTURES IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	0	0	0
P1026 P2-43 ARE CHOKE JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	17	56	0
P1027 P2-44 ARE ROTATING JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	25	83	0
P1028 P2-45 ARE DON'T REMEMBER THE KIND OF JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	10	22	5
P1029 P2-46 DO YOU TUNE CAVITY RESONATORS USING CAPACITIVE TUNING	22	33	17
P1030 P2-47 DO YOU TUNE CAVITY RESONATORS USING INDUCTIVE TUNING	13	22	10
P1031 P2-48 DO YOU TUNE CAVITY RESONATORS USING VOLUME TUNING	17	33	10
P1032 P2-49 DO YOU TUNE CAVITY RESONATORS USING DON'T REMEMBER THE METHOD OF TUNING	8	22	2
P1033 P2-50 DO YOU MEASURE THE FREQUENCY OF SIGNALS IN CAVITY RESONATORS	30	56	19

MICROWAVE AMPLIFIERS AND
OSCILLATORS

DY-TSK	SPC 276	SPC 279	SPC 280
P1034 P3-01 IN YOUR PRESENT JOB DO YOU WORK WITH KLYSTRONS, TRAVELING WAVE TUBES (TWT), PARAMETRIC AMPLIFIERS, OR MAGNETRONS	58	89	45
P1035 P3-02 DO YOU USE OR REFER TO INTERELECTRODE CAPACITANCE	12	17	10
P1036 P3-03 DO YOU USE OR REFER TO ELECTRON TRANSIT TIME	12	22	7
P1037 P3-04 DO YOU USE OR REFER TO LEAD INDUCTANCE	8	17	5
P1038 P3-05 DO YOU USE OR REFER TO RF LOSSES IN EXTERNAL CIRCUITRY	27	44	19
P1039 P3-06 DO YOU USE OR REFER TO PRINCIPLE OF ELECTRON VELOCITY MODULATION	7	11	5
P1040 P3-07 DO YOU USE OR REFER TO ELECTRON BUNCHING	17	39	7
P1041 P3-08 DO YOU WORK WITH TWO-CAVITY KLYSTRONS	5	17	0
P1042 P3-09 DO YOU WORK WITH THREE-CAVITY KLYSTRONS	7	22	0
P1043 P3-10 DO YOU WORK WITH REFLEX KLYSTRONS	27	89	0
P1044 P3-11 DO YOU WORK WITH TRAVELING-WAVE TUBES (TWT)	57	89	43
P1045 P3-12 DO YOU WORK WITH NONDEGENERATIVE PARAMETRIC AMPLIFIERS	23	72	2
P1046 P3-13 DO YOU WORK WITH UP-CONVERTER PARAMETRIC AMPLIFIERS	7	17	2
P1047 P3-14 DO YOU WORK WITH MAGNETRONS	5	17	0
P1048 P3-15 DO YOU INSPECT KLYSTRONS OR TWT	57	83	45
P1049 P3-16 DO YOU CLEAN KLYSTRONS OR TWT	50	78	38
P1050 P3-17 DO YOU TUNE KLYSTRONS OR TWT ELECTRICALLY	53	83	40
P1051 P3-16 DO YOU TUNE KLYSTRONS OR TWT MECHANICALLY	37	78	19
P1052 P3-19 DO YOU PERFORM OPERATIONAL CHECKS OF KLYSTRONS OR TWT	57	83	45
P1053 P3-20 DO YOU TROUBLESHOOT KLYSTRONS OR TWT	52	78	40
P1054 P3-21 DO YOU REMOVE OR REPLACE COMPLETE KLYSTRON OR TWT	57	83	45
P1055 P3-22 DO YOU REMOVE OR REPLACE KLYSTRON OR TWT COMPONENTS	18	33	12
P1056 P3-23 DO YOU INSPECT PARAMETRIC AMPLIFIERS	25	78	2
P1057 P3-24 DO YOU CLEAN PARAMETRIC AMPLIFIERS	25	78	2
P1058 P3-25 DO YOU ADJUST PARAMETRIC AMPLIFIERS	27	83	2

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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                     SPC  SPC  SPC
                   DY-TSK                                            276  279  280

P1059 P3-26 DO YOU TUNE PARAMETRIC AMPLIFIERS                        27   83    2
P1060 P3-27 DO YOU PERFORM OPERATIONAL CHECKS OF PARAMETRIC          27   83    2
      AMPLIFIEPS
P1061 P3-28 DO YOU TROUPLESHOOT PARAMETRIC AMPLIFIERS                27   83    2
P1062 P3-29 DO YOU REMOVE OR REPLACE COMPLETE PARAMETRIC             23   72    2
      AMPLIFIER
P1063 P3-30 DO YOU PEMOVE OP REPLACE PARAMETRIC AMPLIFIER            25   78    2
      COMPONENTS
P1064 P3-31 DO YOU INSPECT MAGNETRONS                                 3   11    0
P1065 P3-32 DO YOU CLEAN MAGNETRONS                                   3   11    0
P1066 P3-33 DO YOU ADJUST MAGNETRONS                                  3   11    0
P1067 P3-34 DO YOU TUNE MAGNETRONS                                    3   11    0
P1068 P3-35 DO YOU PEPFORM OPERATIONAL CHECKS OF MAGNETRONS           3   11    0
P1069 P3-36 DO YOU TROUBLESHOOT MAGNETRONS                            3   11    0
P1070 P3-37 DO YOU REMOVE OP REPLACE COMPLETE MAGNETRON               3   11    0
P1071 P3-38 DO YOU REMOVE OP PEPLACE MAGNETRON COMPONENTS             2    6    0
P1072 P3-39 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        5   17    0
      TWO-CAVITY KLYSTPONS COLLECTOR PLATES
P1073 P3-40 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        3   11    0
      TWO-CAVITY KLYSTPONS CATCHER CAVITIES
P1074 P3-41 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        3   11    0
      TWO-CAVITY KLYSTPONS CATCHER GRIDS
P1075 P3-42 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        2    6    0
      TWO-CAVITY KLYSTRONS FEEDBACK LOOPS
P1076 P3-43 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        2    6    0
      TWO-CAVITY KLYSTPONS DPIFT SPACES
P1077 P3-44 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        2    6    0
      TWO-CAVITY KLYSTRONS BUNCHER GRIDS
P1078 P3-45 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        2    6    0
      TWO-CAVITY KLYSTRONS BUNCHER CAVITIES
P1079 P3-46 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        5   11    2
      TWO-CAVITY KLYSTRONS CONTROL GRIDS
P1080 P3-47 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        7   17    2
      TWO-CAVITY KLYSTRONS CATHODES
P1081 P3-48 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       27   83    2
      REFLEX KLYSTRON REPELLER (REFLECTOR) PLATES
P1082 P3-49 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       17   50    2
      PEFLEX KLYSTRON GRIDS
P1083 P3-50 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       10   28    2
      REFLEX KLYSTRON GRID CAVITY GAPS
P1084 P3-51 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       28   89    2
      PEFLEX KLYSTPON RESONANT CAVITIES
P1085 P3-52 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       13   33    5
      PEFLEX KLYSTRON MAGNETIC COUPLING LOOPS
P1086 P3-53 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       23   67    5
      PEFLEX KLYSTRON FILAMENTS
P1087 P3-54 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF       23   67    5
      REFLEX KLYSTPON CATHODES
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                     SPC  SPC  SPC
                     DY-TSK                                          276  279  280

P1088 P3-55 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        27   78    5
        REFLEX KLYSTRON OUTPUT LEADS
P1089 P3-56 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        53   83   40
        TRAVELING-WAVE TUBES FILAMENTS
P1090 P3-57 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        55   89   40
        TRAVELING-WAVE TUBES CATHODES
P1091 P3-58 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        42   50   38
        TRAVELING-WAVE TUBES MODULATOR GRIDS
P1092 P3-59 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        50   78   38
        TRAVELING-WAVE TUBES ANODES
P1093 P3-60 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        50   83   36
        TRAVELING-WAVE TUBES HELIXES
P1094 P3-61 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        47   78   33
        TRAVELING-WAVE TUBES COLLECTORS
P1095 P3-62 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        37   56   29
        TRAVELING-WAVE TUBES MAGNETS
P1096 P3-63 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF        40   78   24
        TRAVELING-WAVE TUBES ATTENUATORS
P1097 P3-64 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE      23   72    2
        CIRCULATORS
P1098 P3-65 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER SIGNAL       18   56    2
        CAVITIES
P1099 P3-66 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER IDLER        12   33    2
        CAVITIES
P1100 P3-67 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER VARACTOR     27   83    2
        DIODES
P1101 P3-68 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE      23   72    2
        ISOLATORS
P1102 P3-69 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER REVERSE-      8   22    2
        BIAS BATTERIES
P1103 P3-70 DO YOU PERFORM TASKS ON ANODES                             2    6    0
P1104 P3-71 DO YOU PERFORM TASKS ON ANODE COOLING PINS                 2    6    0
P1105 P3-72 DO YOU PERFORM TASKS ON COUPLING LOOPS                     0    0    0
P1106 P3-73 DO YOU PERFORM TASKS ON HEATER LEADS                       0    0    0
P1107 P3-74 DO YOU PERFORM TASKS ON RESONANT CAVITIES                  2    6    0
P1108 P3-75 DO YOU PERFORM TASKS ON CATHODES                           2    6    0
P1109 P3-76 DO YOU PERFORM TASKS ON MAGNETS                            2    6    0
Q1110 Q1-01 DO YOU USE OR REFER TO STORAGE REGISTERS                  60   94   45
Q1111 Q1-02 DO YOU USE OR REFER TO SHIFT REGISTERS                    60   94   45        REGISTERS
Q1112 Q1-03 DO YOU USE OR REFER TO LOGIC SYMBOLS OF SHIFT             58   89   45
        REGISTERS
Q1113 Q1-04 DO YOU USE OR REFER TO LOGIC SYMBOLS OF STORAGE           58   89   45
        REGISTERS
Q1114 Q1-05 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF      55   94   38
        SHIFT REGISTERS
Q1115 Q1-06 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF      57   94   40
        OTHER TYPE OF REGISTERS
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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280	
Q1116 Q1-07 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP OF A SHIFT REGISTER AFTER A SPECIFIED NUMBER OF SHIFT PULSES HAVE PASSED	47	89	29	
Q1117 Q2-01 DO YOU WORK WITH DIGITAL COUNTERS, REGISTERS, OR STORAGE DEVICES IN YOUR PRESENT JOB	45	78	31	
Q1118 Q2-02 DO YOU USE OR REFER TO DELAY LINES	48	78	36	
Q1119 Q2-03 DO YOU USE OR REFER TO MAGNETIC CORES	10	6	12	STORAGE DEVICES
Q1120 Q2-04 DO YOU USE OR REFER TO MAGNETIC DRUMS	7	0	10	
Q1121 Q2-05 DO YOU USE OR REFER TO MAGNETIC TAPES	8	0	12	
Q1122 Q2-06 DO YOU USE OR REFER TO ACCESS TIME OR SPEED OR MEMORY SYSTEMS	8	0	12	
Q1123 Q2-07 DO YOU USE OR REFER TO WORD CAPACITY OF MEMORY SYSTEMS	8	6	10	
Q1124 Q2-08 DO YOU USE OR REFER TO VOLATILITY OF MEMORY SYSTEMS	5	0	7	
Q1125 Q2-09 DO YOU USE OR REFER TO LOGIC SYMBOL OF DELAY LINES	32	44	26	
Q1126 Q3-01 IN YOUR PRESENT JOB, DO YOU WORK WITH DIGITAL-TO-ANALOG (D/A) CONVERTERS, ANALOG-TO-DIGITAL (A/D) CONVERTERS, OR BINARY-TO-DECIMAL READOUT CONVERTERS	48	83	33	
Q1127 Q3-02 DO YOU COMPUTE OUTPUT VOLTAGES FOR ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS FOR GIVEN INPUT VOLTAGES	23	39	17	DIGITAL TO ANALOG CONVERTERS
Q1128 Q3-03 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE COUNT IN ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS IS DETERMINED BY ADDING THE DENOMINATORS OF THE RESISTORS	8	22	2	
Q1129 Q3-04 DO YOU COMPUTE ANALOG VOLTAGES FOR GIVEN BINARY COUNTS IN ELECTRONIC DIGITAL-TO-ANALOG (D/A) CONVERTERS	27	39	21	
Q1130 Q3-05 DO YOU PERFORM SAMPLE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	27	28	26	
Q1131 Q3-06 DO YOU PERFORM HOLD FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	27	28	26	
Q1132 Q3-07 DO YOU PERFORM COMPARE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	27	28	26	
Q1133 Q3-08 DO YOU PERFORM DIGITIZE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	27	28	26	
Q1134 Q3-09 DO YOU PERFORM DON'T REMEMBER WHICH FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	12	17	10	
Q1135 Q3-10 DO YOU USE OR REFER TO SAMPLE FUNCTION OF A/D CONVERTERS	27	22	29	
Q1136 Q3-11 DO YOU USE OR REFER TO HOLD FUNCTION OF A/D CONVERTERS	27	22	29	
Q1137 Q3-12 DO YOU USE OR REFER TO COMPARE FUNCTION OF A/D CONVERTERS	27	22	29	
Q1138 Q3-13 DO YOU USE OR REFER TO DIGITAL FUNCTION OF A/D CONVERTERS	30	28	31	
Q1139 Q3-14 DO YOU PERFORM ANY TASKS ON MECHANICAL ANALOG-TO-DIGITAL (A/D) CONVERTERS	13	28	7	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 276	SPC 279	SPC 280	
R1140 R1-01 DO YOU WORK WITH PHANTASTRON CIRCUITRY IN YOUR PRESENT JOB	15	50	0	PHANTASTRONS
R1141 R2-01 IN YOUR PRESENT JOB DO YOU WORK WITH SCHMITT TRIGGER CIRCUITS	43	44	43	
R1142 R2-02 DO YOU TRACE DATA FLOW THROUGH SCHMITT TRIGGER SCHEMATIC DIAGRAMS	40	39	40	SCHMITT TRIGGERS
R1143 R2-03 DO YOU USE OR REFER TO SCHMITT TRIGGER LOGIC SYMBOLS	35	44	31	
R1144 R3-01 IN YOUR PRESENT JOB DO YOU FABRICATE MULTICONDUCTOR CABLES	65	83	57	
R1145 R3-02 DO YOU FABRICATE COAXIAL CABLES	72	78	69	CABLE FABRICATION
S1146 S1-01 IN YOUR PRESENT JOB DO YOU PERFORM ANY TASKS ON VISUAL READOUT SYSTEMS	48	44	50	
S1147 S1-02 DO YOU PERFORM ANY TASKS ON NIXIE LIGHTS OR NIXIE LIGHT DECODER SYSTEMS	42	22	50	INPUT/OUTPUT DEVICES
S1148 S1-03 DO YOU ANALYZE NIXIE LIGHT DECODER SYSTEMS USING BOOLEAN ALGEBRA	17	11	19	
S1149 S2-01 DO YOU WORK WITH PHOTO TUBES IN YOUR PRESENT JOB	10	22	5	PHOTO SENSITIVE DEVICES
S1150 S3-01 IN YOUR PRESENT JOB DO YOU WORK WITH CHOPPER CIRCUITS	17	33	10	
S1151 S3-02 DO YOU MEASURE EXCITATION FREQUENCIES	2	0	2	
S1152 S3-03 DO YOU MEASURE VOLTAGE-CURRENT PHASE RELATIONSHIPS	3	6	2	
S1153 S3-04 DO YOU USE OR REFER TO EXCITATION FREQUENCIES	0	0	0	
S1154 S3-05 DO YOU USE OR REFER TO VOLTAGE-CURRENT PHASE RELATIONSHIPS	2	6	0	
S1155 S3-06 DO YOU USE SERVOS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	28	0	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)
S1156 S3-07 DO YOU USE DETECTORS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	10	22	5	
S1157 S3-08 DO YOU USE ERROR SIGNAL DEVICES IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	12	28	5	
S1158 S3-09 DO YOU USE COMPARISON CIRCUITS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	12	22	7	
T1159 T1-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH INFRARED SYSTEMS	0	0	0	
T1160 T1-02 DO YOU INSPECT INFRARED SYSTEMS	0	0	0	INFRARED
T1161 T1-03 DO YOU CLEAN INFRARED SYSTEMS	0	0	0	
T1162 T1-04 DO YOU ADJUST OR CALIBRATE INFRARED SYSTEMS	0	0	0	
T1163 T1-05 DO YOU OPERATE INFRARED SYSTEMS	0	0	0	
T1164 T1-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF INFRARED SYSTEMS	0	0	0	
T1165 T1-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF INFRARED SYSTEMS	0	0	0	
T1166 T1-08 DO YOU TROUBLESHOOT DOWN TO INFRARED SYSTEM COMPONENT PARTS	0	0	0	
T1167 T1-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF INFRARED SYSTEMS	2	0	2	
T1168 T1-10 DO YOU REMOVE OR REPLACE INFRARED SYSTEM COMPONENT PARTS	2	0	2	

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PCT MBRS RESPONDING 'YES' BY SELECTED GRPS                                    GPSM15 PAGE  42

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                         SPC  SPC  SPC
                   DY-TSK                                                276  279  280

T1169 T1-11 DO YOU USE OR REFER TO FAR REGION                             0    0    0
T1170 T1-12 DO YOU USF OR REFER TO INTERMEDIATE REGION                    0    0    0
T1171 T1-13 DO YOU USE OR REFER TO NEAR REGION                            0    0    0
T1172 T1-14 DO YOU USE OR REFER TO MICRON                                 0    0    0
T1173 T1-15 DO YOU USE OR REFER TO GRAY BODIES                            0    0    0
T1174 T1-16 DO YOU USE OR REFER TO BLACK BODIES                           0    0    0
T1175 T1-17 DO YOU USE OR REFER TO ABSORPTION                             0    0    0
T1176 T1-18 DO YOU USE OR REFER TO SCATTERING                             0    0    0
T1177 T1-19 DO YOU USE OR REFER TO ABSOLUTE ZERO                          0    0    0
T1178 T1-20 DO YOU PERFORM TASKS ON BLITZ                                 0    0    0
T1179 T1-21 DO YOU PERFORM TASKS ON TARGET BUTTONS                        0    0    0
T1180 T1-22 DO YOU PERFORM TASKS ON ERECTOR LENSES                        0    0    0
T1181 T1-23 DO YOU PERFORM TASKS ON OCULAR LENSES                         0    0    0
T1182 T1-24 DO YOU PERFORM TASKS ON CORRECTION LENSES                     0    0    0
T1183 T1-25 DO YOU PERFORM TASKS ON FILTERS                               0    0    0
T1184 T1-26 DO YOU PERFORM TASKS ON SPHERICAL MIRRORS                     0    0    0
T1185 T1-27 DO YOU PERFORM TASKS ON PLANE MIRRORS                         0    0    0
T1186 T2-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH          0    0    0
        LASERS
T1187 T2-02 DO YOU INSPECT LASER SYSTEMS                                  0    0    0          LASERS
T1188 T2-03 DO YOU CLEAN LASER SYSTEMS                                    0    0    0
T1189 T2-04 DO YOU OPERATE LASER SYSTEMS                                  0    0    0
T1190 T2-05 DO YOU OPERATE LASER SYSTEMS                                  0    0    0
T1191 T2-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF                       0    0    0
        LASER SYSTEMS
T1192 T2-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF LASER                 0    0    0
        SYSTEMS
T1193 T2-08 DO YOU TROUBLESHOOT TO COMPONENT PARTS OF LASER               0    0    0
        SYSTEMS
T1194 T2-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF LASER            0    0    0
        SYSTEMS
T1195 T2-10 DO YOU REMOVE OR REPLACE COMPONENT PARTS OF LASER             0    0    0
        SYSTEMS
T1196 T2-11 DO YOU USE OR REFER TO ANGSTROMS (A)                          0    0    0
T1197 T2-12 DO YOU USE OR REFER TO ELECTRON ENERGY LEVELS                 0    0    0
T1198 T2-13 DO YOU USE OR REFER TO GROUND STATE                           0    0    0
T1199 T2-14 DO YOU USE OR REFER TO EXCITED STATE                          0    0    0
T1200 T2-15 DO YOU USE OR REFER TO PACKET OF RADIATION                    0    0    0
T1201 T2-16 DO YOU USE OR REFER TO PHOTONS                                0    0    0
T1202 T2-17 DO YOU USE OR REFER TO SPONTANEOUS EMISSION                   0    0    0
T1203 T2-18 DO YOU USE OR REFER TO STIMULATED EMISSION                    0    0    0
T1204 T2-19 DO YOU USE OR REFER TO COHERENCE OR INCOHERENCE               0    0    0
T1205 T2-20 DO YOU USE OR RFFER TO INVERSION LEVEL                        0    0    0
T1206 T2-21 DO YOU USE OR REFER TO MONOCHROMATIC                          0    0    0
T1207 T2-22 DO YOU WORK WITH ACTIVE MATERIALS                             0    0    0
T1208 T2-23 DO YOU WORK WITH PUMPING SOURCES                              0    0    0
T1209 T2-24 DO YOU WORK WITH FULL SILVERED (100% REFLECTIVE)              0    0    0
        MIRRORS
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 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING
                                                          SPC  SPC  SPC
                       DY-TSK                             276  279  280

T1210 T2-25 DO YOU WORK WITH HALF SILVERED (92% REFLECTIVE)  0    0    0
        MIRRORS
T1211 T2-26 DO YOU WORK WITH HELICAL FLASHTUBES               0    0    0
T1212 T2-27 DO YOU WORK WITH RUBY                             0    0    0
T1213 T2-28 DO YOU WORK WITH HELIUM-NEON                      0    0    0
T1214 T2-29 DO YOU WORK WITH HELIUM-XENON                     0    0    0
T1215 T2-30 DO YOU WORK WITH XENON                            0    0    0
T1216 T2-31 DO YOU WORK WITH CESIUM-HELIUM                    0    0    0
T1217 T2-32 DO YOU WORK WITH ARGON                            0    0    0
T1218 T2-33 DO YOU WORK WITH NEODYMIUM IN GLASS               0    0    0
T1219 T2-34 DO YOU WORK WITH GALLIUM ARSENIDE                 0    0    0
T1220 T3-01 IN YOUR PRESENT JOB DO YOU WORK WITH DISPLAY TUBES,  3    0    5
        SUCH AS DIRECT VIEW STORAGE (DVST) OR MULTIPLE MODE
        STORAGE TUBES (MMST)                                                    DISPLAY TUBES
T1221 T3-02 DO YOU INSPECT DVST OR MMST                       0    0    0
T1222 T3-03 DO YOU CLEAN DVST OR MMST                         0    0    0
T1223 T3-04 DO YOU ADJUST OR CALIBRATE DVST OR MMST           0    0    0
T1224 T3-05 DO YOU OPERATE SYSTEMS THAT CONTAIN DVST OR MMST  2    0    2
T1225 T3-06 DO YOU TROUBLESHOOT DVST OR MMST                  0    0    0
        CIRCUITS
T1226 T3-07 DO YOU REMOVE OR REPLACE DVST OR MMST TUBES FROM  0    0    0
        MAJOR ASSEMBLIES OR UNITS
T1227 T3-08 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME  0    0    0
        THE VARIOUS ELEMENTS OF DVST
T1228 T3-09 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME  0    0    0
        THE VARIOUS ELEMENTS OF MMST
T1229 T3-10 DO YOU PERFORM TASKS ON FLOOD GUNS                0    0    0
T1230 T3-11 DO YOU PERFORM TASKS ON WRITE GUNS                0    0    0
T1231 T3-12 DO YOU PERFORM TASKS ON ATTACK GUNS               0    0    0
T1232 T3-13 DO YOU PERFORM TASKS ON ERASE GUNS                0    0    0
T1233 T3-14 DO YOU PERFORM TASKS ON STORAGE GRIDS             0    0    0
U1234 U1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY PROGRAMMING  7    6    7
        TASKS                                                                   PROGRAMMING
U1235 U1-02 DO YOU USE OR REFER TO DECIMAL SYSTEMS            7    6    7
U1236 U1-03 DO YOU USE OR REFER TO PROGRAMS                   7    6    7
U1237 U1-04 DO YOU USE OR REFER TO HEXIDECIMAL SYSTEMS        3    0    5
U1238 U1-05 DO YOU USE OR REFER TO 8-4-2-1 SYSTEMS            2    0    2
U1239 U1-06 DO YOU USE OR REFER TO FOUR SYSTEMS               0    0    0
U1240 U1-07 DO YOU USE OR REFER TO BINARY SYSTEMS             7    6    7
U1241 U1-08 DO YOU USE OR REFER TO TIME-SHARING               7    6    7
U1242 U1-09 DO YOU USE OR REFER TO DATA WORDS                 7    6    7
U1243 U1-10 DO YOU USE OR REFER TO ADDRESS WORDS              8    6   10
U1244 U1-11 DO YOU USE OR REFER TO ADDRESS/SUBADDRESS         3    0    5
U1245 U1-12 DO YOU USE OR REFER TO STEERING/INFORMATION       3    0    5
U1246 U1-13 DO YOU USE OR REFER TO INFORMATION WORDS          5    6    5
U1247 U1-14 DO YOU PERFORM TASKS ON SINGLE LEVEL PROGRAMMING  2    0    2
U1248 U1-15 DO YOU PERFORM TASKS ON MULTI-LEVEL PROGRAMMING   0    0    0
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PCT MBRS RESPONDING 'YES' BY SELECTED GPPS                                GPSM15 PAGE  44

 TASK  GROUP SUMMARY
 PERCENT MEMBERS PERFORMING

                                                                   SPC  SPC  SPC
                         DY-TSK                                    276  279  280

U1249 U1-16 DO YOU PERFORM TASKS ON INPUT DEVICES                    3    0    5
U1250 U1-17 DO YOU PERFORM TASKS ON STORAGE DEVICES                  2    0    2
U1251 U1-18 DO YOU PERFORM TASKS ON ARITHMETIC SECTIONS              2    0    2
U1252 U1-19 DO YOU PERFORM TASKS ON CONTROL SECTIONS                 2    0    2
U1253 U1-20 DO YOU PERFORM TASKS ON OUTPUT DEVICES                   3    0    5
U1254 U1-21 DO YOU PERFORM TASKS ON POWER SUPPLIES                   2    0    2
U1255 U2-01 DO YOU USE DECIBELS TO EXPRESS AMPLIFICATION AND        87   94   83
       ATTENUATION                                                                    DB AND POWER RATIOS
U1256 U2-02 DO YOU USE LOGARITHMS TO COMPUTE OUTPUT POWER IN        42   50   38
       DECIBELS
U1257 U2-03 DO YOU USE LOGARITHMS TO COMPUTE ATTENUATION IN         42   50   38
       DECIBELS
U1258 U2-04 DUMMY TASK TO IDENTIFY INCUMBENTS WHO PERFORMED          0    0    0
       NO TASKS
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MISSILE WARNING AND SPACE SURVEILLANCE SENSOR REPAIR CAREER LAD--ETC(U)
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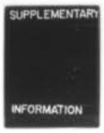

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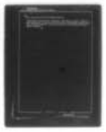

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Teaching methods
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20. ABSTRACT (*Continue on reverse side if necessary and identify by block number*)

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned to Missile Warning and Space Surveillance Sensor Repair Systems Specialty (AFSC 309X0). The report gives a detailed listing of the technical tasks and knowledge needed to perform the jobs within the specialty or career ladder.

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This specialty has the following functions:

Superintends installation, replacement, maintenance, repair, overhaul, and modification of missile warning and space surveillance sensor equipment, special diagnostic checkout equipment; and associated aerospace ground equipment.